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SUPPLEMENT

TO THE

ELEMENTS

OF

NATURAL HISTORY

AND OF

CHEMISTRY.

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TO THE

ELEMENTS

OF

NATURAL HISTORY

AND OF

CHEMISTRY,

OF

M. DE FOURCROY,

DOCTOR OF THE FACULTY OF MEDICINE AT PARIS,
OF THE ROYAL ACADEMY AT PARIS, &c.

CAREFULLY EXTRACTED FROM THE EDITION OF
1789, AND ADAPTED TO THE ENGLISH;

BY THE TRANSLATOR OF THAT WORK.

LONDON:
PRINTED FOR G. G. J. AND J. ROBINSON,
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THE familiar and perſpicuous manner in which M. de Fourcroy has treated the ſcience of Chemiſtry, in his Elements, which were reprinted, with large additions, in 1786, having cauſed a ſpeedy conſumption of that edition, it was found neceſſary to publiſh a third at the beginning of the preſent year. In this laſt he has added the new diſcoveries made ſince 1786, and altered the whole ſo as to make it correſpond with the new Theory and Nomenclature, which have been received and warmly ſupported by himſelf and other eminent French chemiſts. With the intention of extending the knowledge of that Theory and Nomenclature, he has likewiſe annexed the two Tables of Synonyma, with explanatory Memoirs, which were formerly publiſhed by himſelf in conjunction with Meſſrs. de Morveau, Lavoiſier, Berthollett, and de Fourcroy.

The Engliſh edition of this book, publiſhed in 1788, differs, therefore, from the laſt Paris edition in the above particulars. The addition of the new diſcoveries is obviouſly neceſſary to render it complete; but as the new Theory and its Nomenclature are objects of controverſy not yet decided, and moſt of our chemiſts adhere to the theory of Stahl, it evidently appeared that the new edition, if tranſlated, would have been leſs calculated for the Engliſh ſtudent than that which they already poſſeſs. On this account it was thought better to draw out a ſupplement to the former tranſlation, containing all the alterations and additions, except ſuch as merely relate to Nomenclature. The Tranſlator did not, however, think it proper to leave out the Tables of the new Nomenclature; becauſe the number of valuable productions which are written after that ſyſtem, renders it a deſirable object for the chemical inquirer to make himſelf maſter of its principles, whatever may be his objections to the theory it refers to.

It may, perhaps, be inquired why the preſent Supplement is not a tranſlation from the French work of Mr. Adet; and why the Tables of Nomenclature are reprinted, ſince we already poſſeſs an Engliſh edition of them. On theſe heads I muſt obſerve, that the preſent Supplement was begun by a careful collation of the two editions before the French Supplement could be procured from Paris; and that, when this came to hand, I found ſufficient reaſons to proceed with my labour, inſtead of uſing that work. It is not neceſſary, in this place, to ſay more than that a compariſon of the two will ſhew the propriety of this determination to ſuch as may conſider it as an object worth their inquiry.—With regard to the Tables of Nomenclature, it may be obſerved, that as M. de Fourcroy ſtood in exactly the ſame predicament at Paris, in that reſpect, as I do here, it became incumbent on me to be directed by his motives.

The inducements of common honeſty and delicacy naturally prevented my copying the tranſlation of Mr. St. John; but I have compared my tranſlation with his, and find few eſſential variations, except ſuch as M. de Fourcroy himſelf has choſen to make.

I do not apprehend that any reader will find the leaſt difficulty in underſtanding the references made in this Supplement to my Tranſlation of the Elements: though I have not tediouſly ſwelled it out, by inſerting the paſſages which are altered. Thus it will be ſeen that I have ſeldom ſaid, *inſtead* of * * * * *read* * * * * *, but have ſimply ſaid, *read* * * * * *; and have continued the new matter until I came to the unaltered text, of which I have uſually inſerted a few words, with an &c. In theſe caſes all the matter of the text, which lies between the place firſt referred to and the &c. muſt be left out. This is indeed ſufficiently obvious, and the other references need no explanation.

WILLIAM NICHOLSON.

New North-ſtreet,
London, October 6, 1789.

SUPPLEMENT
TO THE
ELEMENTS
OF
NATURAL HISTORY
AND
CHEMISTRY.

PART I.

ADDITIONS AND ALTERATIONS IN CHAPTER I.

Page 5, the following lines are added to the concluding paragraph.

"IT proceeds ſtill further; it appreciates, as we ſhall ſhew in the examination of vegetable ſubſtances, the re-action of the principles upon each other, and determines the cauſes which thus modify, change, and alter thoſe principles".

P. 8, l. 13.

After the words "each other" the reſt of the paragraph is cancelled.

P. 10, l. 30.

The two following ſentences, from the words "ſome readers" to the word "health," are cancelled.

P. 13, l. 10.

Inſtead of the words "is not yet univerſally received," read, "has not yet been adopted by any chemiſts."

P. 14, l. 6.

Inſtead of "M. Bucquet and myſelf," read, "We."

P. 19, l. 25.

The example of acids and alkalis is left out.

ALTERATION IN CHAPTER II.

P. 42.

INSTEAD of the concluding paragraph of this chapter, the Author has ſubſtituted the following:

“ Since the death of that celebrated chemiſt, the ſcience has gained ſo much by the new diſcoveries, that the modern theory daily acquires new acceſſions of force: the large maſs of facts I have collected during the ſpace of twelve years attention to this ſcience, the number of experiments which I have repeated, have convinced me that it is abſolutely impoſſible to avoid admitting this theory; and that ſuch philoſophers as continue to ſupport, with more or leſs heat, the doctrine of phlogiſton, all give proofs in their works that they are not perfectly acquainted with the ſcience, or are in ſome reſpect deficient in the art of making experiments.”

ADDITIONS AND ALTERATIONS IN CHAPTER III.

IN this Chapter, as well as in moſt other parts of the work, the Author has ſubſtituted the word "attraction" where in the former edition he uſed the word "affinity."

P. 44.

The effect of attraction upon two globules of water, which is animadverted upon in the note, is not mentioned in the new edition.

P. 45, l. 11.

The words "at a certain diſtance" are altered to "at the point of contact."

P. 46, l. 15.

After the word "fuſion," add, "and cooling."

P. 49, l. 4.

The words "or reduce it to nothing" are ſtruck out.

P. 50, l. 4.

Inſtead of "filtration" the word "heat" is ſubſtituted, and the remainder of the paragraph is thus altered :

"Heat and evaporation produce the ſame effect upon fluids, as well as upon moſt ſolids which are capable of becoming ſoft or melting. But theſe laſt methods, in which heat is the agent which divides bodies, depend themſelves upon a chemical attraction of the ſecond kind. The ſame may be ſaid of diſſolution in water."

P. 53, l. 9.

Read, "a little differing."

P. 55, l. 21.

Inſtead of "minute bodies," read, "the ultimate particles of bodies."

P. 56, l. 11.

The words "infinitely ſmall particles" are omitted.

P. 56, at bottom.

Read, "Among the gaſes, for example, which of all known ſubſtances are thoſe whoſe aggregation is weakeſt, there are ſeveral whoſe tendency to combination is ſo ſtrong, that they unite with the greateſt vivacity to almoſt all natural bodies. Nevertheleſs, we ſhall hereafter ſee that this takes place only when the heat which is combined in elaſtic fluids, adheres but weakly to its baſe, and that the aerial force very frequently oppoſes combination, as is obſerved in pure air."

P. 57.

The whole paragraph beginning with the

word "laſtly," and ending with the words "each other," is left out.

P. 59, l. 10.

Inſtead of "cannot," read, "can ſcarcely ever."

P. 60, l. 26.

For "ſmall bodies," read, "the ultimate particles of bodies."

P. 63, l. 5.

For "warmer," read, "colder."

P. 63, l. 3 (from the bottom).

Strike out the word "though," and likewiſe the ſix following lines of the paragraph after the word "unite."

P. 66, l. 7.

The paragraph here ends at the word "proof." The introductory ſentence next following is left out, and the next paragraph begins thus:

"To ſhew (1) that bodies which enter into combination loſe the properties they before poſſeſſed: (2) That they acquire new properties totally different; let us fix our attention upon ſuch properties as, if varied, will affect the ſenſes," &c.

P. 66, l. 25.

Inſtead of "can by no means be regarded as," read, "certainly is not."

P. 66, l. 4 (from the bottom).

Read as follows: "A few grains of oxigenated muriatic acid diluted in a glaſs of water, and a few grains of mercury ſeparately given, are not capable, &c."

P. 67, l. 10 (from the bottom).

At the word "acids" the following note is added:

"We are obliged to make uſe of terms and denominations in this preliminary matter, which are yet unknown to the learner; but the index and the commencement of the articles of the work to which the index refers, may be conſulted for the explanation of theſe words. This is an inconvenience which cannot be avoided in the elements of a ſcience."

P. 68, l. 10 (from the bottom).

Read, "Sulphur and fixed alkalis form livers of ſulphur, which are very fœtid when moiſtened."

P. 68, l. 8 (from the bottom).

Read the paragraph as follows:

"We may make the ſame obſervation with reſpect to fuſibility. Two ſubſtances which are very infuſible or very difficult to fuſe ſeparately, become very fuſible when they are united; the combinations of ſulphur and of metals afford very ſtriking examples of this aſſertion."

P. 70, l. 9 (from the bottom).

Inſtead of " though it cannot be thence inferred that there is no affinity between them," read, " though it would be falſe to aſſert, that there is no mutual attraction between them."

P. 71, l. 2.

After the word " compound," inſert, " Bergman deviſed the name of elective attractions to expreſs that there is a kind of choice between thoſe bodies, which in order to combine together are decompoſed or ſeparated from matters before united with them."

P. 73, l. 8.

The ſentence, " To avoid this confuſion, &c." to the end of the paragraph, is left out.

P. 75, l. 3.

Read, " In ſome caſes there is a certain method of immediately diſtinguiſhing an impure from a pure precipitate; it conſiſts in adding a much greater quantity, &c." and proceed as in line 7.

P. 76, l. 4.

The ſentence, " As there ſeems to be," &c. to the end of the paragraph, is left out.

P. 80, l. 8.

Inſtead of the word " Cornette," the words " Scheele, &c." are inſerted.

P. 87, l. 2.

From the words " this objection" to the full ſtop at " modified" in line 12, are left out, and, inſtead thereof, the following are ſubſtituted :

" A plate of metal which adheres to the ſurface of mercury cannot be taken up without ſeparating the latter into two ſtrata ; ſo that the weight neceſſary to raiſe the plate is employed in overcoming the adheſion of the particles of mercury to each other, rather than in deſtroying that of the foreign metal with the mercury.

" We may therefore affirm that if the chemical attraction be the ſame force with the general attraction, the difference of its laws, compared with thoſe of this laſt, ſhews that it is a peculiar modification. This truth," &c.

P. 88.

The paragraph beginning " if we might preſume" is left out.

ALTERATIONS AND ADDITIONS IN CHAPTER IV.

P. 91, l. 10.

AFTER the word "ſubſtances," inſert, "ſeparately."

P. 95, l. 12.

The remarks numbered 2 and 3, ending at the word "circumſtances," are left out. The remark numbered 4 is numbered 2 in the new edition, and the following is added at the end of the paragraph:

"3. That among natural bodies there is a great number, ſuch as ſulphur, and the metals which art has not ſucceeded in decompoſing, and which are ſimple bodies in the preſent ſtate of our knowledge."

P. 96.

After line 4, the conſtruction and ſenſe are thus altered:

"It follows, that the true principles or firſt elements of natural ſubſtances eſcape our ſenſes and our inſtruments; that many of thoſe which have been called elements, on account of their volume, their influence in the phenomena of nature, and their multiplied exiſtence in its different products, are very far from being ſimple and unchangeable bodies; and that probably there is no body which falls under our ſenſes which is ſimple, but only appears ſuch to us, becauſe we do not poſſeſs the means of decompoſing it. Theſe aſſertions moreover agree," &c.

P. 96, l. 9 (from the bottom).

The remainder of the paragraph is ſtruck out, and the following words ſubſtituted inſtead:

"as containing the principles of which moſt other natural bodies are formed."

ALTERATIONS AND ADDITIONS IN CHAPTER V.

P. 100, l. 11.

READ, "this opinion no longer exiſts among philoſophers who cultivate the ſcience of chemiſtry."

— l. 14.

Read, "theories propoſed ſome years paſt, reſpecting fire."

— l. 20.

Read, "we ſhall conſider in ſucceſſion as ſo many particular effects of fire, light, heat, rarefaction, the changes produced in bodies by heat, and thoſe which are attributed to combined fire, formerly called phlogiſton."

P. 101, l. 12.

Read, "this ſubſtance which is thought to be emitted."

P. 101 (laſt two lines of the text).

Read, "ſubject to gravitation, is an evidence of its exiſtence as a body itſelf."

P. 106, l. 10.

Inſtead of the words "and roots," inſert, "&c."

P. 108, l. 1.

For "only," read, "firſt," and inſtead of "we propoſe," &c. at the end of the paragraph, add, "M. Berthollett has likewiſe attended to this ſubject, and we ſhall hereafter ſee that he has determined what happens in many of theſe alterations."

P. 109.

Read, "it cannot be proved by weight that heat, &c."

P. 115, l. 6.

For "vapour," read, "heat."

P. 118, l. 12.

After the word "principles," read, "it exiſts in a ſtate of compreſſion, more or leſs conſiderable."

P. 118, laſt line of the text.

The ſentence beginning with "They are of opinion," and ending with the word "occaſions," is left out.

P. 120.

The note is left out, and at l. 9 of the text, the ſubject is continued thus: "Some philoſophers think that light and heat are the ſame ſubſtance, and differ only in their ſtate. This body is light, when its particles, collected together, and poſſeſſing all their attraction, are projected with great force; it is heat when the ſame particles, in a ſtate of diviſion, move ſlowly, and tend to an equilibrium. They think that heat can become light, and light heat;—it cannot, however, be denied that light often produces effects very different from heat; as takes place in the nitric acid, the oxigenated muriatic acid, the metallic calces or oxides, and the leaves of vegetables plunged in water: all theſe bodies give out vital air, or oxigenous gas, when they are expoſed to the rays of the ſun, and moſt of them do not afford it by the action of heat alone. It is in this manner that the artificial light of our fires, paſſing through the veſſels, changes the nature of the products which are diſengaged.

Laſtly, Mr. Lavoiſier and De la Place," &c.

P. 123, l. 1.

The firſt ſentence of the paragraph is thus altered: "Let us here attend to the reſemblance which appears to exiſt, in certain caſes, between light and heat, and the differences which diſtinguiſh them in the proceſſes of nature and art."

P. 124, l. 18.

For "incaleſcence," read, "incandeſcence"

P. 125.

The two laſt paragraphs are left out, and the following inſerted: "Such were the ideas of Macquer and a conſiderable number of other philoſophers; but more numerous and better obſerved facts, concerning the difference of heat contained in various bodies, their aptitude to abſorb it, the elective attractions it appears to obey, render the opinion of the exiſtence of heat as a peculiar body, much ſtronger than ever. It is thought to be often one of the principles of compound ſubſtances; that it is the lighteſt of all natural bodies, and cannot, on that account, be ſhewn to exiſt by any indication of weight. Two ſpecies of heat are diſtinguiſhed, or rather heat itſelf is diſtinguiſhed in two different ſtates, in all natural ſubſtances; one, which is intimately combined, and is called latent heat, or caloric, becauſe it is not ſenſible, and the other which is ſimply diſſeminated. This laſt appears to be capable of expulſion by ſimple preſſure, or by mechanical means; thus it is that when a bar of iron is hammered, and its particles are brought together by the ſhock, the heat eſcapes in the ſame manner as water flows out of a moiſtened ſpunge by preſſure. Heat, truly combined, does not quit bodies but in conſequence of new chemical combinations. All ſolid ſubſtances which contain theſe two kinds of heat, are capable of taking up a greater quantity, both of the one and of the other; this ſuperadded heat ſeparates the particles more and more: its firſt effect is to ſoften the ſolid body; its ſecond, in proportion as it is accumulated, conſiſts in fuſion, or liquefaction; its third, the quantity being ſuppoſed ſtill to be continually increaſed, is elaſtic fluidity. But we will treat of theſe phenomena in the two following paragraphs."

P. 126, l. 8.

Inſtead of the laſt ten lines of the firſt paragraph, read as follows:

"This rarefaction ſhews the intromiſſion of ſome ſubſtance into the pores of the rarefied body; this ſubſtance, which is heat itſelf, acts like wedges or ſprings, that ſeparate and remove the particles of theſe bodies from each other; the bodies themſelves, when rarefied by heat, do not acquire weight, and their ſpecific gravity is leſs conſiderable than before, becauſe the rarefaction conſiſts ſimply in a ſeparation of the parts of the heated body, whoſe pores are then enlarged, ſo that it contains more void ſpace and leſs ſolid matter than before, in a given ſpace: this ſeparation is occaſioned by the matter of heat, whoſe weight with reſpect to us is nothing.

P. 128, l. 2.

Read, "it appears to be ſubject to ſome exceptions;" after which the reſt of the paragraph is thus altered: "In fact, a gentle heat really dilates their fibres, ſeparates them, and diminiſhes the denſity of their texture; but by a ſudden and ſtrong heat, parchment, membranes, and tendons ſhrink and contract; a property which ſeems to depend on the irritability, or rather the contractibility of animal fibres, to which heat ſeems to be a ſtimulus, as long as their organiſation is not deſtroyed."

The laſt ſentence, "We find even in ſome," &c. is excluded.

P. 129, l. 18.

After the word "furnace," read, "and not to preſs too cloſely ſuch veſſels as are luted together; for, without that precaution, it would not be poſſible to avoid the fractures and inconveniences which their expanſion would produce."

P. 131, l. 7.

The four following lines are thus altered: "It may be conceived from what is here expoſed, that this general effect depends on the circumſtance, that a ſolid body which becomes liquid abſorbs more heat than it before poſſeſſed; whereas, in the contrary circumſtance, it gives out the quantity of heat which kept it in a ſtate of fuſion."

In the following title, read, "Phlogiſton of Stahl."

P. 133, l. 20.

After "diſengaged," inſert, "in the form of fire at liberty."

P. 134, l. 3.

The two following paragraphs are thus altered:

"However brilliant this theory may be, it is eaſy to conceive that it is ſubject to a great difficulty; in fact, Stahl and all his followers have not ſufficiently ſpecified what the phlogiſton is, but have expreſſed themſelves in too vague and obſcure a manner. Macquer, who was well aware of this difficulty, after having long meditated on the nature of fire and phlogiſton, concluded that light poſſeſſed all its properties, whether it be conſidered as at liberty, in a ſtate of agitation, and poſſeſſing all its properties, or whether it be conceived as a principle of bodies tending to quit them by motion.

" In the explanation of a ſyſtem admitted in the ſciences, it is neceſſary at the ſame time to point out its difficulties and ſhew its errors: we think proper therefore, in this place, to point out the objections which are now made to the doctrine of this great chemiſt; a doctrine which has not loſt its reputation, till after having conſtituted one of the moſt brilliant epochas of chemiſtry."

P. 137, l. 3.

Read, " This however muſt be underſtood with ſome reſtriction; for, notwithſtanding the immenſe reſearches made of late years into the phenomena of combuſtion, the opinion which admits the exiſtence of fire as a principle fixed in bodies, has not yet been overthrown, and its name of phlogiſton has been changed into that of caloric or combined heat. But it is not to this matter that the property of combuſtibility is attributed. Its preſence in inflammable bodies is not that which determines their inflammability.

" Since the attention of chemiſts," &c. and proceed as in line 22.

P. 139, l. 6.

Inſtead of " precipitation on," read, " combination with."——Alſo, line 7 from the bottom, after " phlogiſton," add, " by conſidering this principle as fixed light."

The two laſt lines of p. 139, and the firſt of p. 140, are ſtruck out.

P. 140, l. 12.

Inſtead of " perfectly anſwers," read, " appeared to anſwer."

P. 140, l. 12 (from the bottom).

The ſentence beginning with " This important poſition" is left out, and the remainder of the ſection is thus altered: " Scheele has propoſed a different theory, which has had its adherents among the northern chemiſts. He ſuppoſed that fire, heat, and light, were compounds of vital air and phlogiſton; that, by paſſing through the veſſels, it depoſited its phlogiſton, and the vital air was diſengaged as in the reduction of the metallic calces or oxides. But this ingenious theory, by the aſſiſtance of which Scheele explained the influence of ſolar light and heat differently modified, in a great number of chemical phenomena, does not afford the reaſon of the increaſe of weight in metals, ſulphur, phoſphorus, &c. after their combuſtion.

“ Mr. Lavoiſier, whoſe opinion ought to have as much weight in chemiſtry as his experiments have had influence on its progreſs, has offered a new doctrine, which many French chemiſts have adopted, and which appears to me to explain, the moſt perfectly of all, the theories the phenomena of nature. He thinks that light, heat, and all the great phenomena which combuſtible bodies preſent in their inflammation, depend more upon the air which favours this laſt proceſs, than on their own proper nature; that the flame which takes place in this operation, ariſes rather from the light diſengaged from the pure air, than from that which is ſeparated from the combuſtible body. The decompoſition which takes place, according to Stahl and Macquer, in the inflammable ſubſtance, is by him attributed to the pure air, which he conſiders as a compound of the matter of fire and another principle we ſhall hereafter ſpeak of; and the fixed fire, whoſe diſengagement produces the principal effect, is, according to him, ſeparated from the pure air rather than from the combuſtible body. We cannot enter more fully in this place into this ingenious ſyſtem; we ſhall dwell more largely upon it in the hiſtory of air, which belongs to the following chapter. We ſhall content ourſelves by obſerving, that the matter of fire or heat, which Mr. Lavoiſier admits in pure air, and whoſe diſengagement is, according to him, the cauſe of the dazzling flame and ſtrong heat which attend the rapid combuſtion produced by this air, performs nearly the ſame office as the phlogiſton of Stahl, or the fixed light of Macquer, and that all chemiſts are agreed concerning its exiſtence; but that they differ in this, that ſome admit its exiſtence in the combuſtible bodies, and conſider it as the cauſe of inflammability; others think that it exiſts in the air, and that it is not the ſubſtance which determines the combuſtibility. We ſhall in the following chapters explain the reaſons which lead us to think, that this laſt opinion is the moſt probable."

P. 144, l. 4 (from the bottom).

Read, "aſcends, and remains ſuſpended, or diſſolved, until condenſed by cold."

P. 146, laſt line.

Read, "The oily matter and the charcoal, which are the component parts, decompoſe a portion of the contained water, and form an acid, elaſtic fluids, and a brown oil, which did not exiſt as ſuch in the wood, &c. Every part is therefore changed," &c. as in l. 9, p. 147.

P. 147, l. 16.

Eraſe the word "ſalts," and inſert the word "acid."

P. 147, line 10 (from the bottom).

Inſtead of the laſt ſentence of the paragraph, beginning with "and for that reaſon," read, "but the modern diſcoveries are able to determine the true nature of the principles which conſtitute theſe matters, from the conſideration of thoſe which are diſengaged."

P. 149.

After the word "accuracy," in line 4, the following paragraph is inſerted:

"As theſe various effects of heat ariſe from the ſeparation which it produces between the particles, let us again conſider this firſt effect, and endeavour to appreciate its whole influence."

After which follow the pages xxvii, xxviii, xxix, xxx, and xxxi, of the Preliminary Diſcourſe, beginning with the words "Water in the form of ice," and ending with "the application of a great degree of cold." The following alterations are made in thoſe ſelected pages, viz.

At p. xxix, l. 14.

The words "acetous acid," &c. are eraſed, and the ſubject is continued thus: "Theſe three fluids are reduced into vapours, and preſerve their aerial form, when the barometer ſtands at 28 inches, and the water poſſeſſes the temperature of 80 degrees of Reaumur's thermometer, ſpirit of wine 66, and the ether 32."

P. xxx, l. 17.

After the word "ſubſtances," add, "We have ſought for an expreſſion which might denote this

his ſtate of combination in heat; we have adopted the word caloric, becauſe, in fact, when this body is fixed it is no longer heat, but becomes ſo only when ſet at liberty. This denomination likewiſe avoids the periphraſes of the matter of heat, or latent heat, which have been the expreſſions hitherto uſed. Cooling, or the tranſition of heat to the ſtate of caloric; heating, or the tranſition of caloric to the ſtate of heat, depend on the general law we have eſtabliſhed;" and proceed as in line 19.

P. 151, paragraph 1.

Read, "The temperature of boiling water, or 212 degrees, is uſed in decoctions, the extraction of eſſential oils," &c.

P. 151, l. 3 (from the bottom).

Add, "A ſimilar degree of heat may be excited by a ſtream of vital air or oxigenous gas thrown upon charcoal, by means of the bellows or blow-pipe. Mr. Monge is of opinion, that by preſenting atmoſpheric air in a ſtate of compreſſion, to combuſtible bodies in a ſtate of inflammation in the furnace, an effect may be produced ſimilar to that excited by vital air. This proceſs may hereafter be applied to operations in the large way."

P. 152, l. 6.

The account of Mr. Wedgwood's inſtrument is rectified as follows:

"Mr. Wedgwood has conſtructed in England a thermometer of this nature; it is formed of ſmall pieces of clay half an inch in diameter. Theſe pieces, when contracted by heat, advance to a greater or leſs diſtance between two rules of copper convergent towards each other upon a plate of the ſame metal. In this manner by means of a ſcale drawn upon theſe rules, the degree of contraction, and conſequently of heat, which they have experienced, is aſcertained." *Journal de Phyſique*, 1787.

P. 154, l. 9.

Inſtead of " principal part of the chemical nomenclature," read, " practical part of chemiſtry."

P. 154, l. 4 (from the bottom).

Read, " or their ſalts. Calcareous ſtones are thus converted into lime," &c.

P. 155, l. 5.

After " baked clay," inſert, " of iron and of platina."

P. 157, l. 6 (from the bottom).

Read, " Evaporation is the action of heat upon liquids."

P. 163, l. 11.

M. Black has contrived furnaces which appear proper to produce a regular and uniform heat by means of regiſters, which are opened or cloſed at pleaſure. We have not received ſufficient information to enable us to conſtruct the like; but as the art of chemiſtry cannot but be greatly benefited by this diſcovery, it is to be hoped that it will be ſpeedily adopted in France*.

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* Dr. Black's furnace is deſcribed in the Edinburgh New Diſpenſatory, printed in the year 1786, p. 49, 50.

ALTERATIONS AND ADDITIONS IN CHAPTER VI.

IN this chapter, the air is diſtinguiſhed by the epithet common or atmoſpherical.

P. 164, l. 8.

After "atmoſphere," inſert, "It penetrates likewiſe and fills the interſtices or pores which exiſt between the integrant parts of bodies."

——l. 10.

For "ſuch air," read, "pure air."

P. 165, l. 10 (from the bottom).

Read, "aeriform fluids or gaſes."

——l. 5 (from the bottom).

Read, "as moſt liquid ſubſtances do; that is to ſay, we are unacquainted with the preſſure or degree of refrigeration capable of rendering them ſolid; and this is the character of permanent gaſes."

P. 172, at the bottom.

Read, "Mr. De Luc and Mr. De Sauſſure have paid great attention to this important ſubject for ſome years paſt."

P. 174, l. 6 and 7 (from the bottom).

Eraſe the two lines of the ſentence following the word "proceſs," and alſo the word "almoſt" in line 5.

P. 175, l. 3 and 4 (from the bottom).

Read, "The ſame phenomenon takes place with oils, reſins," &c.

P. 177, laſt line.

Eraſe the words "and exiſts likewiſe in the nitrous acid, and in nitre."

P. 178, l. 9.

Read, "But as this denomination may convey a falſe idea of the nature of this elaſtic fluid, we ſhall adopt the name of vital air, becauſe it is the only fluid," &c. as in line 16.

P. 179, l. 8.

For "is," read, "was at firſt."

P. 181, l. 1.

The ſentence included between the brackets is left out.

——l. 6.

Read, "peculiar principle capable of becoming ſolid, and the matter of heat or fire, to which laſt it owes its aerial form; that it is decompoſed in combuſtion, its fixed and ſolid principle uniting with the combuſtible body, and by that means changing its nature, and adding to its weight, while the matter of fire is diſengaged in the form of light and heat."

P. 182, l. 7.

The date is altered to May, 1787.

——l. 10.

Inſtead of the two remaining ſentences of this paragraph, the following is inſerted: "The theory we have here exhibited daily acquires new force; the objections of thoſe who do not yet admit it have done it no injury; they even prove that, with a more accurate knowledge of the whole of this theory, the chemiſts who oppoſe it would be ſenſible of the inſufficiency of the objections they urge; and that, when this knowledge ſhall become more extended, all philoſophers will be neceſſarily of one ſentiment."

——l. 8 (from the bottom).

Read, "It is a ſlow combuſtion, in which part of the heat of the vital air paſſes into the blood, which circulates through the lungs, and is with it diſperſed through all the organs: thus it is that the animal heat is repaired, which is continually carried off by the atmoſphere and by ſurrounding bodies. The maintenance of the heat of the blood is therefore one of the principal uſes of reſpiration; and this happy theory explains why animals which do not reſpire the air, or which reſpire it very little, have cold blood.

"Meſſieurs Lavoiſier and De la Place have diſcovered a ſecond uſe of air in reſpiration;

namely, to abſorb a principle which exhales from the blood, and appears to be of the ſame nature as charcoal. This body reduced into vapours combines with the oxigene of the vital air, and forms carbonic acid, which iſſues out of the lungs by the expiration. This formation of carbonic acid which takes place in atmoſpheric air reſpired by animals, at the ſame time that the mephitis is ſeparated, clearly ſhews the dangerous conſequences which reſult from too great a number of perſons being included in cloſe places, ſuch as theatres, hoſpitals, &c." as in line 3 from the bottom of page 183.

P. 184, l. 16.

Eraſe laſt ſentence.

P. 184.

At the end of this chapter is added the following:

"§ 3. Concerning the characters of mephitis, or azotic gas, which forms part of the atmoſphere.

"From all the foregoing details it follows, that atmoſpheric air is compoſed of two gaſes, or elaſtic fluids; the one, which maintains combuſtion and reſpiration; and the other, which cannot ſerve in the production of either of theſe phenomena. The firſt, which is called vital air, is in the proportion of 0, 27 or 0,28; the other amounts to 0, 73, or 0, 72. We have obſerved that the former is compoſed of caloric and oxigene; the ſecond is likewiſe, as all gaſeous bodies are, a compound of caloric and of a baſe capable of becoming ſolid. This elaſtic fluid, which forms more than two thirds of the air of the atmoſphere, was at firſt called mephitis by Mr. Lavoiſier, becauſe it extinguiſhes bodies in combuſtion, and deſtroys animal life; but as all the gaſes, except vital and atmoſpherical air, are equally noxious, and as the name of mephitis is a general expreſſion which belongs to them all alike, and has always been given to elaſtic fluids, which are not reſpirable, we have adopted the name of azotic gas for this aeriform fluid; and this denomination has permitted us to give the name azote, or the ſubſtantive, to the baſe of this gas, which, like that of vital air, or oxigene, becomes fixed by combining with various ſubſtances. To give in this place ſome information reſpecting the nature of this azotic gas, we ſhall deſcribe ſome of its properties. It is ſomewhat lighter than atmoſpheric air, and occupies the upper part of rooms in which the air is altered by reſpiration and combuſtion. Though it is very noxious to animals in its ſtate of elaſtic fluidity, yet its baſe, or azote, is one of the component parts of their bodies, from which it is obtained in very great quantities. It is one of the conſtituent parts of volatile alkali, or ammoniac, and of the nitric acid. It appears to be abſorbed by vegetables, and perhaps even by animals. It is likewiſe very probable that it forms one of the principles of all the alkalis, and that it may be conſidered as the true alkaligene, oppoſed to the baſe of vital air, which, as we have obſerved, is oxigene. The atmoſphere would be then, according to theſe conſiderations, an immenſe reſervoir of the acidifying and alkalifying principles, without being itſelf either acid or alkaline.

"All theſe properties can be no more than announced in this place; they will be demonſtrated and explained much more fully in the other chapters. We have been deſirous of ſhewing the difference which exiſts merely between the two elaſtic fluids which conſtitute the air of the atmoſphere, and of fixing the attention on each of them."

ALTERATIONS AND ADDITIONS IN CHAPTER VII.

P. 185, l. 1.

READ, "The late reſearches of Meſſieurs Lavoiſier, Meuſnier, De la Place, and Monge, have ſhewn."

——l. 6.

Read, "We ſhall ſee below in what manner theſe philoſophers have ſucceeded in analyſing water."

P. 187, l. 10 (from the bottom).

Read, "A heat of ſome degrees of Reaumur's thermometer is produced in water by the act of freezing, becauſe it is a liquid body which becomes ſolid. This thermometer, plunged in water which congeals, riſes more or leſs above 0, though another placed in the atmoſphere at a temperature cold enough to freeze water, remains conſtantly at 0, or even beneath it. It follows therefore," &c. as in the laſt line.

I muſt here remark, that the paſſage, even as it is altered by the ingenious author, is not perfectly accurate. It is true, that heat is given out in the act of freezing, as is manifeſted by the increaſe of temperature, which takes place upon the congelation of water which has been cooled below the freezing point; but it is not true that the temperature ever riſes beyond that point. In fact, the congelation ſtops, the moment the unfrozen part of the water has arrived at the higheſt temperature which ice is capable of ſuſtaining without melting; and in the natural proceſs, the congelation is continued by the low temperature of the air and other ſurrounding bodies, which conduct off the heat.

P. 190, at the end of paragraph No. 5.

Add "and is always owing to the air interpoſed between their particles; for every ſubſtance, ſingly conſidered, is more denſe and heavy in its ſtate of ſolidity than when fluid."

P. 191, l. 4.

Read, "Modern chemiſts think that it abſorbs heat in melting, and that this abſorption is equal with regard to the quantity of caloric which becomes fixed, and the quantity of heat which is diſengaged when it becomes congealed."

P. 195, l. 3 (from the bottom).

Read, "in the ſtate of vapour, or elaſtic fluid."

P. 196, at the end of paragraph No. 2.

Add, "and conſequently to a true precipitation."

P. 196, paragraph No. 3.

Read, "according to Mr. Watt, 800 times the ſpace it poſſeſſed in the liquid form."

P. 197, paragraph No. 7.

Doctor Lewis long ſince determined that the æolipile excites combuſtion in no other way than by driving a ſtream of air againſt the ignited body, together with the ſteam which eſcapes out of the engine. For the effect is not produced, if the orifice of the æolipile be inſerted through a hole in the ſide of a furnace, inſtead of cauſing the ſteam to paſs through a body of interpoſed air. See Lewis's Philoſophical Commerce of Arts. Remark of the Editor.

P. 202, l. 9 (from the bottom).

Eraſe "nor the putrid ſpiritus rector."

P. 204, l. 4.

Read, "It is to ſeveral French academicians."

P. 207, l. 4 (from the bottom).

After "inflammable air," inſert, "or more accurately 0, 86 of the former, and 0, 14 of the latter of theſe ſubſtances."

P. 208, l. 9 (from the bottom).

The remainder of this chapter is altered as follows:

"We think it proper to make ſome obſervations in this place, in order to render this theory more clear and accurate.

" We have obſerved, that all aeriform fluids owe their gaſeous ſtate to the matter of fire or heat which is united to them. It is the ſame with inflammable gas. Now, as the decompoſition of water, and its converſion into inflammable gas, never take place but at a temperature conſiderably elevated, and as its rapidity is greater in proportion as the heat is ſtronger; we ſee that this gas does not poſſeſs the aeriform ſtate, nor acquire ſo much levity, but becauſe its baſe, which partook of the liquidity of the water, abſorbs a great quantity of heat; ſo that it cannot be obtained but in this ſtate of extreme fuſion. It is neceſſary, therefore, to give a name to this baſe of inflammable gas, which, when it is combined to that of vital air or oxigene in water, may even become ſolid, as is conceived in ice. This baſe, conſidered as one of the eſſential principles of water, ought to have a name expreſſive of this property. We have adopted the word hydrogene, which very well anſwers the propoſed intention: we ſay, therefore, that water is a compound of the baſe of vital air, or oxigene, and the baſe of inflammable gas, or hydrogene; and as many bodies are inflammable in the ſtate of elaſtic fluids, ſuch as alcohol, ether, the volatile oils, &c. we diſtinguiſh this principle of water in the aeriform ſtate by the words hydrogenous gas.

“ We ſhall return to this important ſubject in another chapter. It is ſufficient to have ſhewn in the preſent, that water is not a ſimple ſubſtance, but is ſuſceptible of decompoſition. Nature in the large way effects the diſunion of its principles with much more facility, and by a greater number of proceſſes than art poſſeſſes. It is by its decompoſition that water ſerves to purify the atmoſphere by emitting vital air; that large quantities of inflammable gas are diſengaged from ſtagnant water; that the atmoſphere is ſometimes ſo highly charged with it, that the re-eſtabliſhment of the equilibrium of the electric fluid ſets it on fire, and gives riſe to fiery meteors; that water contributes to the formation of ſaline matters, of which pure air is conſtantly one of the principles. Laſtly, this brilliant diſcovery of the principles of water, its decompoſition and recompoſition, throws great light on many phænomena of nature, and in particular on the renewal of the atmoſphere, the ſolution of metals, vegetation, fermentation, putrefaction, as we ſhall fully explain in the ſeveral chapters of this work.”

ALTERATIONS AND ADDITIONS IN CHAPTER VIII.

P. 212, l. 12.

READ, " 1. Becauſe this earth is not equally pure in all the ſtones, wherein Macquer and Stahl himſelf have admitted it; for example, in quartz, rock cryſtal, and flints. 2. Becauſe we find all the properties of terreſtrial ſubſtances in ſeveral matters which differ from vitrifiable earth, only in the earthy characters being not in ſo marked a degree. 3. Becauſe it is not at all proved that vitrifiable earth is the baſe of all ſolid matters, and all earths, as ſome chemiſts have thought.

This, therefore, is the opinion we think proper to be adopted on this head. Nature preſents," &c. as in the laſt line.

P. 216, l. 15.

Add, " which we call barytes."

P. 217, l. 3.

Read, " it is called"—and at l. 6, add, " but the name of ſilex, derived from that of ſiliceous earth, which has been given to it, becauſe it exiſts in all the ſiliceous ſtones, is that to which we give the preference."

—— l. 8.

After " argillaceous," read, " or alumine."

PART II. SECTION I.

ALTERATIONS AND ADDITIONS IN CHAPTER III.

P. 269, l. 14.

INSERT, "The number of theſe ſtones is much leſs than Bucquet ſuppoſed."

P. 297, l. 12 (from the bottom).

Eraſe the words, "but it is not known whether they are formed by fire."

P. 315.

In a note on ponderous earth, the author remarks, that in this detail he follows the denominations given by Bergman; and that it will be eaſy to refer the ancient names, whether of the earthy baſes or the acids united to them, to the new and methodical denominations given to thoſe bodies in the hiſtory of ſaline matters in the body of the work. Reference is made to the end of the firſt and ſecond volumes.

He takes notice likewiſe, that the aerated ponderous earth was found native in England ſince the death of Bergman, and refers to the extract of Kirwan's Mineralogy, page 336.

PART II. SECTION II.

ALTERATIONS AND ADDITIONS IN CHAPTER I.

P. 359, l. 15.

AFTER the word "act," inſert, "This ſalt really acts by a chemical force, ſince it produces its effect on the inſenſible ſkin of dead bodies, as Mr. Poulletier has proved by accurate experiments; and, in general, on all animal ſubſtances, which it diſſolves. Cauſticity, therefore, depends," &c.

P. 362, l. 8.

The remainder of this ſection, being altered in various places, runs thus: "The valuable experiments of Mr. Lavoiſier ſhew, that ſeveral combuſtible bodies form, by their combuſtion, acids of a particular nature, according to the ſubſtance burned. Combuſtion, as we have already explained, is nothing more than a combination of the baſe of vital air with combuſtible bodies. All bodies which have been completely burned, that is to ſay, which have combined with oxigene in a ſufficient quantity to be ſaturated, enter into the claſs of incombuſtible bodies; or, which is the ſame thing, their tendency to combine with oxigene being ſatisfied, they are no longer capable of uniting with or abſorbing more. Theſe principles being once proved, if on the one part it be found, that many ſalts are the reſidues of various combuſtible matters which have been burned; and if, on the other part, an entire claſs of theſe ſalts be found to contain oxigene, and to exhibit the characters of ſubſtances which have paſſed through the proceſs of combuſtion, it will eaſily be conceived that they cannot continue to be combuſtible. Theſe aſſertions are founded on a great number of facts, as will hereafter be ſeen; they prove that ſalts are compounded ſubſtances, moſt of them being formed by the union of certain combuſtible bodies with oxigene. And it will be underſtood with equal facility, that this character of incombuſtibility may be conſidered as the moſt certain and invariable property of ſaline matters. The proof of theſe important aſſertions will, we hope, appear complete with regard to the claſs of acid ſalts, in the details which will conſtitute the particular hiſtory of theſe ſubſtances.

There exiſts, nevertheleſs, a claſs of ſalts which appear evidently to be compounded, and do not contain oxigene. Such are the alkalis in general: but they are either compoſed of matters which are themſelves incombuſtible; or, if they contain any combuſtible ſubſtance, as will be ſhown in ammoniac or volatile alkali, it is united to a ſubſtance evidently incombuſtible, which abſolutely prevents this property from being ſenſible in the other ſubſtance."

P. 364, l. 8 (from the bottom).

Read, "and it may be ſtrongly preſumed by analogy, that moſt of this claſs of ſalts are compounded in the ſame manner. Water, without being one of the immediate principles of ſalts, is often united, and adheres to them by a very ſtrong attraction. As to the matter of fire, conſidered as phlogiſton, which very great chemiſts have admitted in ſalts, there is too much uncertainty at preſent reſpecting the nature, and even the exiſtence, of this matter, to juſtify the adoption of any decided opinion. It is not the ſame with caloric, which appears to form one of the principles of ſalts, or rather to exiſt in a greater quantity in ſome than in others; ſuch is the general cauſe of the fluidity, fuſibility, and volatility of a great number of ſaline matters.

"The preſence of earth in moſt ſalts is not ſhown by any direct experiment; it is only known, that all native ſalts are mixed with a greater or leſs quantity of various earthy ſubſtances. But theſe do not belong to them; they do not, properly ſpeaking, enter into their compoſition, but are as it were acceſſaries. We do not, therefore, at preſent know any other principles of ſaline ſubſtances except ſeveral combuſtible matters, oxigene, ſome incombuſtible ſubſtances, and caloric. It is known, that moſt acids are the reſidues of burned bodies, and that they can contain different proportions of combuſtible matter and oxigene, ſo that they exiſt in very different ſtates according to the quantity of theſe conſtituent matters. Every thing more which has been ſaid, in treatiſes of chemiſtry, upon the compoſition of ſalts in general, amounts to nothing more than hypotheſes, more or leſs ingenious, but at the ſame time more or leſs remote from truth."

P. 366, laſt paragraph.

Read, "The mineral kingdom, as far as our preſent knowledge extends, conſiſts of nine genera and eighty-ſix ſpecies of ſalts, either ſimple or compound, differing from each other. We ſhall proceed to examine theſe in ſucceſſion."

In a note on this paragraph Mr. Fourcroy remarks, that there are three ſalino-terreſtrial ſubſtances, three alkalis, and ten mineral acids; and that theſe, united to alumine, the three ſalino-terreſtrial baſes, and the three alkalis, conſtitute ſeventy neutral or compound ſalts.

ALTERATIONS AND ADDITIONS IN CHAPTER II.

P. 367.

TO the title of this chapter is annexed a note, obſerving that the title itſelf is the general denomination of the firſt genus of the firſt order of ſimple or primitive ſaline matters.

P. 368, l. 2.

At the foot of the page is the following note:

"We have already ſpoken of them in the lithology; but we did not then conſider them but as forming part of the knowledge of natural hiſtory."

P. 370, l. 2.

Inſert, "The action of oxigene and azote on this ſaline earth is not known; perhaps it may contain azòte, as one of its conſtituent parts."

Alſo, line 6, read, "feeble green;" and line 7, after "violets," inſert, "and eſpecially to that of mallows or radiſhes."

P. 370, laſt paragraph.

Read, "Barytes has but a weak action, either in the dry or humid way, on ſilex and on alumine; it may nevertheleſs facilitate the fuſion of theſe earths, and it aſſumes a blue or greeniſh colour when heated with the latter."

P. 371, l. 3.

After the word "deſcription," inſert, "It is probable that it may be more abundant than has been ſuſpected. It was formerly known only in the barytic ſulfate or ponderous ſpar; it has been found a conſiderable time ago in England, combined with carbonic acid, and cryſtallized like a tranſparent ſpar. We ſhall deſcribe this ſalt in future. Some modern chemiſts ſuppoſe it to be a calx or metallic oxide from its weight, and that of the compounds into which it enters, and likewiſe the precipitate it affords when Pruſſian alkali is added to its acid ſolution," &c. as in line 9.

At the end of the paragraph, at the word "compoſition," inſert, "I ſuſpect, as I have before taken notice, that it may contain azote, or the baſe of mephitis."

P. 377, l. 5.

Read, "Theſe vapours produce a green colour in paper ſtained with mallows."

P. 379, l. 6.

After "atmoſphere," inſert, "Hence it is that the cream of lime cannot be formed without the contact of the air."

After line 7, inſert, "The actions of oxigene and azote upon lime are not known; it ſeems that this baſe abſorbs and fixes a portion of azotic gas; or, at leaſt, it is probable that it contains the baſe of that ſubſtance."

P. 381, line 11 (from the bottom).

Eraſe the ſeven following lines from the ſemicolon to the full ſtop.

P. 382, l. 3.

"It ſeems indeed to be out of doubt, that it is formed by marine animals; that its conſtituent parts are united and combined in the water during the life of theſe organic beings; and that azote is one of its conſtituent parts. But it muſt be confeſſed, that this ſketch is not yet ſufficient for the conviction of modern philoſophers, who do not form their opinions decidedly, unleſs in conſequence of repeated and accurate experiments.

"Lime is employed," &c.

P. 383, l. 11.

Read, "The ſpecies of alkali which we denote by the name of potaſh, has been called vegetable fixed alkali, becauſe it is found," &c.

—— l. 19.

Inſert, "Formerly, to diſtinguiſh this ſalt from the common fixed alkali, it was called cauſtic fixed alkali."

P. 385, l. 4.

Inſert, " The action of oxigene and of azote upon this alkali is not known."

P. 387, l. 7.

Read, " It is probable that potaſh is a compound of one of the three preceding earths with azote. Some analogies lead me to believe that it contains lime; but we do not poſſeſs a ſufficient number of facts to admit this compoſition as a demonſtrative truth."

P. 388, l. 9.

We call it ſimply by the name ſoda.

P. 389, l. 22.

Read, " ſecondary or neutral ſalts."

—— l. 7 (from the bottom).

Inſert, " The ſame analogies lead me to believe, that this, like the foregoing, is a combination of an earth with azote; and that its characteriſtic properties depend on the difference of its earthy baſe. Perhaps this may be magneſia, as I have for ſeveral years hinted in my Lectures, and as Mr. Lorgna has ſince attempted to prove; but the facts are not ſufficiently numerous, nor even exact enough, to place this opinion in the rank of demonſtrated truths."

—— l. 3 (from the bottom).

Read, " We give the name of ammoniac to

the ſalt known by the name of the volatile alkali."

P. 391, l. 7 (from the bottom).

After "violets," inſert, "mallows and radiſhes."

P. 392, l. 11.

Read, "The cauſe of this change is not yet well known. It appears only, that the alkali is decompoſed in this experiment, and that its two component parts, as we ſhall preſently obſerve, are ſeparated, and put into the ſtate of elaſtic fluidity."

P. 394, l. 6.

After "gas," inſert, "with a certain quantity of caloric." Alſo, at the end of the paragraph, inſert, "with a certain quantity of caloric."

P. 395.

The note is omitted.

SUPPLEMENT

TO THE

ELEMENTS

OF

NATURAL HISTORY

AND

CHEMISTRY.

ADDITIONS AND ALTERATIONS IN VOLUME II.

THE Author has placed the fourth chapter on Acids at the end of the firſt volume.

CHAP. IV.

Page 1.

The note is omitted.

P. 2, l. 15.

The reſt of the paragraph from the word "air" is eraſed.

—— l. 20.

Inſert, "The phoſphoric acid is likewiſe found in this kingdom, united to iron, to lead, and to lime."

At the foot of the page inſert

" The molybdic acid.
The tungſtic acid.
The arſenic acid.
And The ſuccinic acid.

We ſhall here treat of the ſix firſt, which are in general the beſt known and moſt abundant; the four others ſhall be treated of elſewhere."

P. 3, l. 2.

Read, " We give the name of carbonic acid to a very abundant acid, which being often found in the aeriform ſtate, was originally called fixed air," &c.

—— l. 6.

After the word " Bergman," the paragraph concludes in this manner: " and cretaceous acid by Bucquet." We ſhall preſently explain the reaſon and the utility of the denomination we have adopted.

P. 3, l. 14.

The ſentence reſpecting the name of cretaceous acid is omitted.

——l. 3 (from the bottom).

After "acid" inſert the word "gas," and after the word "part" in the laſt line inſert, "Like air, it is inviſible and elaſtic; it cannot be diſtinguiſhed from this fluid when incloſed in a glaſs veſſel, or when it floats in the air."

P. 7, l. 8 (from the bottom).

Eraſe the word "fixed."

P. 8, at the bottom.

Add, "which was formerly called concrete volatile alkali, Engliſh ſalt," &c.

P. 9, l. 10 (from the bottom).

After the words "pure air," read, "But the diſcovery of the nature and decompoſition of water has ſhewn the improbability of this hypotheſis, and Mr. Lavoiſier has ſubſtituted a demonſtrated truth in its ſtead. This chemiſt," &c. as in line 6 from the bottom.

P. 12, l. 17.

Add, "in France. Beſides which, this effect is contrary to the diſcoveries of Scheele and Bergman upon the ſtone of the bladder, as we ſhall elſewhere obſerve."

P. 12, at the end.

The Author has here inſerted his obſervations on the cretaceous acid from the Preliminary Diſcourſe, vol. 1, page xlvi. to xlix. with the following variations.

The paragraph begins thus: "It is to the firſt diſcovery of this acid by Dr. Black that we muſt fix one of the moſt brilliant epochas of chemiſtry. To determine the influence of this diſcovery on the ſcience, we ſhall here offer the following remarks."

The note at foot of page xlvii. is left out.

P. xlix, l. 4.

Inſert, "Theſe new facts will be expoſed more at length in the other chapters of our work."

P. 14, l. 4.

Read, "over mercury, at the preſſure and temperature of the atmoſphere."

P. 15, l. 6.

Inſert, "It is aſſerted, that, by ſtrongly agitating the liquid muriatic acid with vital air, a portion of the latter is abſorbed."

P. 16, l. 18.

Eraſe the words "as Mr. Lavoiſier ſuppoſes," and inſert, "as we have already explained elſewhere"

P. 17, l. 10.

Inſert, "As its acidifiable baſe is unknown, it cannot be determined whether two ſtates exiſt with reſpect to the ſaturation of this baſe, by oxigene: the firſt in which the baſe would be ſaturated, and the acid the ſtrongeſt; the ſecond in which there ſhould not be the ſame quantity of oxigene, and the acid ſhould be weaker, as we have obſerved with reſpect to the ſulphuric and ſulphureous, the nitric and the nitrous acids. The preſence of oxigene has not even been demonſtrated in the muriatic acid; and it is only by the force of analogy that we are led to admit its exiſtence in this acid.

P. 18, l. 8.

Read, "veſſels containing water plunged in ice."

P. 18, l. 3 (from the bottom).

After the word "ſalt," read, "which depends on the diſengagement of the gas of the oxigene, which ſaturated the acid."

P. 19, after l. 9.

Inſert, "Laſtly, the oxigenated muriatic acid changes the metals into calces, and diſſolves them without effervefcence; it paſſes to the ſtate of ordinary muriatic acid, by deſtroying vegetable colours."

—— after l. 18.

Inſert, "He has lately diſcovered, March 1787, that the oxigenated muriatic gas, received in a ſolution of cauſtic potaſh, forms a neutral cryſtallizable ſalt, which detonates upon charcoal like nitre, and even more ſtrongly, which affords very pure vital air, or oxigenous gas, by the action of fire, and leaves after theſe two eſſays the muriate of potaſh. Theſe experiments prove more and more the theory which I firſt explained ſeven years ago, of the nature of the oxigenated muriatic acid; ſince the detonation of the muriate of potaſh is manifeſtly owing to the ſuperabundant oxigene. Soda forms only a deliqueſcent ſalt with the oxigenated muriatic acid."

P. 20, l. 8.

Read, " any conſiderable uſe."

—— l. 13.

Add, " He has lately propoſed it to be uſed in bleaching cloths and thread; and the firſt trials made at Paris, on a ſcale of conſiderable magnitude, promiſe to be ſucceſsful. It may likewiſe be uſed for ſpeedily bleaching yellow wax, and particularly the green wax of our iſlands."

P. 21, l. 5.

Read, " A peculiar phenomenon attends their combination, when the acid has been extracted in glaſs veſſels, namely," &c.

—— l. 20.

Add, " Though the fluor acid gas, in its union with water, depoſits a great quantity of ſiliceous earth, it ſtill retains a ſomewhat conſiderable portion which is precipitated by alkalis."

P. 21, line laſt but one.

Add, " But as water does not entirely ſeparate it, we ſee that the liquid fluor acid can act on the earthy part of glaſs, and upon ſiliceous ſtones."

P. 22, l. 12.

Read, " But Scheele has unanſwerably confuted this opinion, and conſiders it as a peculiar acid."

—— l. 18.

Read, " Bergman and Scheele."

P. 25, l. 11 (from the bottom).

Read, " This coloration is accompanied with a diſengagement of vital air. Heat volatilizes the acid of nitre, and ſeparates the coloured part in the form of red vapours.

" The red acid unites with great violence to water," &c. as in line 9 from the bottom.

P. 26, l. 8.

Read, " and emits only a white fume."

—— l, 16.

Inſert, " We call the white or colourleſs acid the nitric acid, and that which is coloured, we call the nitrous acid."

P. 27, l. 8.

Read, " It muſt be obſerved, that the red heat of the veſſels ſeparates ſome red vapours from the paleſt nitrous acid, and changes the colour of the acid itſelf, which becomes reddiſh. But," &c.

P. 27, l. 16.

Add, " The ſame thing happens when water is added to highly coloured nitrous acid: a red vapour is diſengaged into the air; the heat which this combination produces, colours this acid already weakened, and converts it from the nitric to the nitrous ſtate. When heat, aſſiſted by light, produces this change in the nitric acid, there is a diſengagement of a certain quantity of vital air or oxigenous gas, proportioned to the nitrous gas which is formed. It is in conſequence of the attraction which exiſts between light, caloric, and oxigene, that this decompoſition of the nitric acid, and its change into nitrous acid, take place. The effect of the red heat of our veſſels imitates that of the ſolar rays.

P. 31, l. 4, 5, 6.

Read, " Light diſengages oxigenous gas or vital air. Heat decompoſes the oxigenated muriatic acid."

P. 37, l. 11, to 16.

Read, " We ſhall ſhortly ſee that this is not the true cauſe of the phenomenon."

P. 37, l. 17, to the end of the paragraph.

Read, " The portion of gas which remains after the mixture of vital air and nitrous gas, formed likewiſe an objection againſt Mr. Lavoiſier's theory; and though this reſidue was very inconſiderable in his experiment, ſeven parts and one third of nitrous gas, with four parts of vital air, having left only the thirty-fourth part of their whole bulk, yet it was embarraſſing to diſcover the reaſon. It is true, that Mr. Lavoiſier has ſince aſcertained, that the reſidue is much ſmaller when the materials are very pure and accurately proportioned to each other; and we ſhall proceed to ſhew that it is poſſible to make a combination of vital air and nitrous gas, ſufficiently pure to leave no reſidue."

P. 40, l. 13.

After "phenomena," inſert, "1ſt, We may conceive, that in this acid the azotic gas and vital air are deprived of much caloric; and, conſequently, that they are in the ſtate of azote and oxigene. 2dly, That when it is decompoſed by a combuſtible body, the nitrous gas, which is diſengaged, does not require ſo much caloric to convert it into the elaſtic form, as vital air and azotic gas do. 3dly, That theſe two elaſtic fluids cannot combine in their gaſeous ſtate. 4thly, That, conſequently, the vital air, obtained from nitrous preparations ſtrongly heated, ſuch as red precipitate, the nitrate of lead, common nitre, &c. muſt contain a portion of mephitis, or azotic gas, and that it is this gas which forms the reſidue

due after the union of vital air and nitrous gas; a reſidue which does not exiſt when vital air is uſed, which has been diſengaged from the leaves of vegetables, or from manganeſe. 5thly, That the ſame thing ſometimes happens with the nitrous gas, which may contain a portion of azotic gas or diſengaged mephitis; that this muſt happen when the gas is prepared with bodies, which, being very greedy of oxigene, take it almoſt entirely from the nitric acid, ſuch as iron, the oils, &c. 6thly, That the nitrous acid which is coloured, and contains an exceſs of nitrous gas, or azote, or the baſe of mephitis, is in a very different ſtate from that whoſe two principles are in a ſtate of ſaturation; and that, by reaſon of their different properties, it is neceſſary to diſtinguiſh them by particular names. We name the pale acid, which is the ſcarceſt and moſt pure, the nitric acid, to conform to the other denominations; and its neutral ſalts we call nitrates. We give the name of nitrous acid to that which is red, and that of nitrites to its ſaline combinations. It is true that we ſeldom have occaſion to ſpeak of theſe laſt; for, though the nitrous acid, or that which is red and fuming, is more common than the pale, it ſeldom happens that it remains ſuch in its combination with the alkaline baſes; the exceſs of nitrous gas eſcapes during the combination, and the nitric or pure acid only enters into the compound. We ſhall ſee that theſe ſalts, called nitrites, which contain the acid, with exceſs of nitrous gas, are not formed, except by the action of heat upon the true nitrates."

P. 41, l. 11 (from the bottom).

Add, " its extraction and nature require, therefore, that, in a methodical and regular nomenclature, it ſhould be called the ſulphuric acid.

" When it is well concentrated, it has been very improperly called oil of vitriol, on account of its conſiſtence."

P. 41, laſt line.

Eraſe the words " which would afford a ſtrong confirmation of the doctrine of Stahl."

P. 44, l. 11 (from the bottom).

After " emitted," inſert, " The noiſe produced during this union, ariſes from the eſcape of the air contained in the water, which is ſeen to eſcape in the form of ſmall bubbles."

P. 47, l. 2.

Inſert, " Though it has been conſidered as one of the permanent gaſes, it appears to be capable of condenſation to the liquid ſtate, by a great degree of cold. Mr. Monge has ſucceeded in rendering it liquid by this proceſs."

P. 48, l. 8 (from the bottom).

Inſert, " That which here happens ſlowly, takes place very rapidly in the combuſtion of ſulphur, during which this combuſtible body abſorbs the oxigene of the atmoſphere, and becomes more and more acid, until its complete ſaturation."

P. 51, l. 12.

Inſtead of the laſt ſentence of the paragraph, read, " It has ſince been named the acid of borax ; we prefer the name of the boraxic acid, in order to give this word the termination of all the other acids."

——after l. 14.

Inſert, " As theſe two acids are combinations of ſulphur and oxigene in different proportions, their names ought to have an analogy with their nature ; thoſe of ſulphuric and ſulphureous acid appeared to me to be well adapted : the termination of this laſt word expreſſes the exceſs of the combuſtible baſe, as in the other acids."

P. 52, l. 19.

Read, " and alſo thoſe of turnſole, mallows, radiſhes," &c.

P. 56, l. 2.

Add, " As they differ much from the ſalts formed by the other acids hitherto examined, they prove ſtill more evidently, that this acid is of a peculiar nature, whoſe principles are not yet known."

P. 56, l. 6.

After " narcotic," inſert, " He called it ſedative ſalt, or volatile narcotic ſalt of vitriol, becauſe he had obtained it by ſublimation of a mixture of nitre and vitriol."

ALTERATIONS AND ADDITIONS IN CHAPTER V.

Page 58, line 2.

READ, " from the name of their baſe, which is adopted by the moderns."

—— l. laſt but one.

" We call them barytical ſalts."

P. 59, l. 9 (from the bottom).

Add, " As we have not hitherto examined any but the ſix principal acids, we ſhall treat only of the neutral ſaline combinations of theſe."

P. 59, at the end.

The Author has added the following paragraph:

" To denote all theſe ſalts, we ſhall adopt names compoſed of the acids and their baſes, in order that this nomenclature may expreſs the nature of each, and that there may no longer be any error on this point; we ſhall be careful to join a table, to exhibit the different names which each neutral ſalt has received at different times."

P. 67, after l. 5.

Read, " The ſulphureous, or ſulphuric acid with exceſs of ſulphur, united to vegetable alkali,

kali, forms a ſalt ſomewhat different from the preceding, which Stahl called ſulphureous ſalt, and which we ſhall name ſulphite of potaſh. This ſalt cryſtallizes in polyhedrons with ten faces, or in two tetrahedral pyramids, truncated at their baſes. It is very bitter, very ſoluble, and ſlightly deliqueſcent: almoſt all the mineral acids, and ſeveral vegetable acids, diſengage the ſulphureous acid in the form of gas, with efferveſcence. When expoſed to the air, the ſulphite of potaſh gradually abſorbs oxigene, and becomes ſulphate of potaſh."

P. 67, l. 11 (from the bottom).

Inſert, "Its cryſtals likewiſe vary in ſize from that of very fine priſms or ſmall needles, to that of large priſms, near an inch in diameter, and ſix or eight inches in length, which are obtained in cryſtallizations in the large way."

P. 75, l. 6 (from the bottom), and the following lines.

Read, "Inſtead of obtaining the pure acid, a large quantity of aeriform fluid is diſengaged, which may be collected over water, and is found to be true vital air mixed with azotic gas. The alkaline reſidue uſually cauſes the retort to melt very ſpeedily, and the operation cannot be completed but in a ſtone-ware retort, of very refractory compoſition. Here we ſee the nitric acid entirely decompoſed into vital air and azotic gas, by means of the heat, which alone ſeparates the two principles. If the heat be not urged ſo as entirely to decompoſe the nitre, the alkali will remain charged with a certain quantity of nitrous acid, or nitric acid with exceſs of nitrous gas; this acid may be diſengaged by means of vinegar: the ſalt, in this ſtate, is what we call nitrite of potaſh, by reaſon of the ſtate of the nitrous acid ſurcharged with azote; in the ſame manner as we call ſulphite of potaſh the combination of the ſulphureous acid with this alkali. If the nitrate of potaſh be more ſtrongly heated, the alkali remains pure and cauſtic."

P. 81, l. 5 (from the bottom of the text).

Read, "does not afford nitrous acid, but vital air mixed with azotic gas."

P. 82, l. 7.

Eraſe the two lines expreſſing Mr. Baume's opinion, and in the following line 10 read, "diſtillers of aqua fortis at Paris."

P. 83, after l. 9.

Add, "though he was of opinion, that the decompoſition of this ſalt was owing to a portion of that acid contained in clays."

P. 87, l. 5.

After the word "fuming," inſert, "in conſequence of the diſengagement of a portion of vital air."

P. 88, l. 9 (from the bottom).

Read, " vital air mixed with azotic gas."

P. 106, l. 7.

The remainder of this paragraph is altered as follows:

" Some chemiſts have thought that litharge is capable of decompoſing the muriate of ſoda in the cold, and by ſimple maceration: it appeared, that, by uniting the two properties, the firſt of containing carbonic acid capable of attracting the ſoda, and the ſecond of forming an inſoluble ſalt with the muriatic acid, which would therefore be eaſily ſeparated from the alkaline lixivium, the litharge might act by a double affinity; but my trials on this head have proved that the proceſs is inſufficient. Scheele found that iron, plunged in a ſolution of muriate of ſoda, became covered with ſoda, ſaturated with carbonic acid. He had the ſame ſucceſs with the ſulphate and nitrate of ſoda, or Glauber's ſalt, and rhomboidal nitre, treated in the ſame manner. He diſcovered, that quicklime, mixed with a ſolution of muriate of ſoda, and left in a moiſt cellar, afforded an effloreſcence of ſoda, and that calcareous muriate was formed. Cohauſen announced this fact, in the year 1717. Mr. De Morveau has proved that theſe decompoſitions are effected by favour of the carbonic acid; becauſe a ſolution of the ſulphate and muriate of potaſh, poured into lime-water, rendered turbid by the carbonic acid, became clear and tranſparent ; and becauſe there is no precipitate afforded by pouring water impregnated with carbonic acid into a mixture of lime-water, and a ſolution of theſe ſalts."

P. 108, in addition to the Tranſlator's note.

Reference may be made to the Philoſophical Tranſactions, vol. lxxvii. numbers 28 and 29 ; and alſo vol. lxxix. p. 96, for full accounts of the place and manner of its production.

P. 110, l. 10.

Inſert, " This fact, though announced near ten years ago, has not ſince been confirmed."

P. 111, l. 3.

The Author has inſerted an addition of ſix lines, to the ſame effect as the note at the foot of the page ; and at the ſame time obſerves, that the name of borax is retained to this ſubſtance, to diſtinguiſh it from the true borate of ſoda, which is ſaturated with the acid.

P. 112, l. 15.

Add, " and perhaps, likewiſe, on the different proportions of the acid of borax and ſoda, which enter into its compoſition."

P. 130, l. 14.

The whole paragraph, to line 12 on the following page, is left out.

P. 131, after l. 18.

Add, “ We have ſeen that litharge, propoſed by ſome chemiſts to produce this effect, does not well decompoſe the ſalt; that Scheele has diſcovered a more evident decompoſition of the muriate of ſoda, by lime and iron, with the aſſiſtance of the contact of the atmoſphere, and the carbonic acid it contains. We ſee, that a proportion of this acid, greater than that which commonly exiſts in the atmoſphere, muſt favour this decompoſition, by acting upon the ſoda by its attraction.”

ALTERATIONS AND ADDITIONS IN CHAPTER VI.

P. 132, after line 8 (from the bottom).

INSERT, "This, like every other cryſtallization, appears to depend upon the manner in which the cryſtalline laminæ depoſit themſelves, whether on their broadeſt ſides, their edges, or their angles.

P. 133, l. 16.

Read, "ſiliceous earths."

—— line the laſt.

Read, "ſeparate part of the."

P. 148, l. 8 (from the bottom).

After the word "ſpread," inſert, "or by combining the carbonic acid gas and the ammoniacal or alkaline gas, directly over mercury; the two gaſes penetrate each other immediately, much heat is excited, and a concrete ſalt is formed on the ſides of the glaſs veſſel wherein the mixture is made. In all theſe caſes," &c.

ALTERATIONS AND ADDITIONS IN CHAPTER VII.

P. 158, l. 13.

AFTER "ſelenite," read, "If a ſolution of barytes be poured into water, loaded with this ſalt, ſtriæ of barytical ſulphate or ponderous ſpar are formed."

—— l. 20.

Add, "more eſpecially by their ſolubility in a large quantity of water."

P. 160, the paragraph following l. 20 is thus altered:

"Calcareous ſulphate, or ſelenite, is decompoſed by a great number of combuſtible matters, by the aſſiſtance of heat. The charcoal of vegetable ſubſtances deprives the ſulphuric acid of the oxigene, to which it has a greater affinity than ſulphur has. Carbonic acid is diſengaged in this decompoſition, and the ſulphur, ſeparated from the ſulphuric acid, unites to the lime, and forms the ſubſtance called calcareous hepar; but which we ſhall hereafter diſtinguiſh by the name of ſulphure of lime."

P. 163, the two laſt lines.

Read, "vital air is obtained; and, towards the end, azotic gas."

P. 165, l. 13 (from the bottom).

Inſtead of the laſt ſentence of the paragraph, read, "This effect depends either on a ſmall quantity of magneſia, or the avidity of the calcareous nitre for water, which it takes from the lime."

P. 169, l. 11 (from the bottom).

Add, "Sometimes, when the cryſtallization not taken place, and the bottle is agitated, the maſs ſuddenly becomes ſolid throughout, much heat being at the ſame time diſengaged."

P. 172, l. 3.

The ſentence reſpecting Mr. Chambon is omitted.

—— l. 12.

Add, "I have collected together all that experience has already taught us concerning the virtues of this ſaline ſolvent, in a memoir, inſerted among thoſe of the Royal Society of Medicine, for the years 1782 and 1783."

P. 173, l. 5 (from the bottom).

Add, "cubic, becauſe it always has that form; and, laſtly, phoſphoric, becauſe, when heated and carried into the dark, it appears luminous."

P. 184.

The ſecond note, concerning nomenclature, is omitted.

P. 185, l. 16.

Inſert, "There likewiſe exiſt among the foſſil remains of marine animals, bodies whoſe form and organization cannot, in any reſpect, be referred to any known inhabitant of the ſea. Though we do not yet poſſeſs any complete treatiſe upon foſſil animals, and though this part of natural hiſtory has not been treated with the ſame care and preciſion as mineralogy, the deſcription of a conſiderable number of theſe bodies is ſufficient to prove, that animals have exiſted in the ſea whoſe ſpecies have been deſtroyed."

P. 194, l. 4 (from the bottom of the text).

This paragraph is altered as follows:

"As the chemical properties depend on the combination or principles of bodies, it is neceſſary to give them names expreſſive of their nature; from this conſideration, the ſeveral calcareous ſubſtances we have treated of muſt be chemically treated of under the denomination of calcareous carbonate. It is upon the moſt tranſparent calcareous ſpar, or pure white marble, that the experiments muſt be made, which eſtabliſh the properties of this earthy ſubſtance."

P. 200, l. 9 (from the bottom).

Inſert, "the receiver being kept cool with wet cloths, or by a ſmall ſtream of cold water, which runs on it during the whole operation."

ALTERATIONS AND ADDITIONS IN CHAPTER VIII.

P. 205, l. 7.

ADD, "The decompoſition by volatile alkali is partial; for this ſubſtance remains partly united to the acids, at the ſame time as the magneſia and other parts form ammoniaco-magneſian ſalts."

—— l. 8.

Read, "We ſhall examine ſix of theſe ſalts in the preſent chapter, namely," &c.

P. 209, l. 15.

Read, "But this is an error; for the ſalt, which cryſtallizes in this operation, is a true triple ſalt, or ammoniaco-magneſian ſulphate, as I am aſſured by experience."

P. 210, l. 6 (from the bottom).

Add, "but it is always accompanied with muriate of magneſia."

P. 211, l. 14.

Read, "But the ſame chemiſt having obſerved, that freſh lime-water precipitates pure calcareous nitre, when the water of ſolution is not ſufficient in quantity, the magneſia obtained by this proceſs will not poſſeſs the degree of purity requiſite for a medicine of ſuch utility, if the precipitation be effected on mother waters which are not diluted with a very large quantity of fluid."

P. 216, l. 8 (from the bottom).

Add, "The volatile alkali does not decompoſe it completely, but forms a triple cryſtallizable muriatic ſalt, with the remaining portion of magneſian muriate."

P. 217, at the bottom.

Add, "It is very probable, that the precipitated cryſtals are not pure, but belong to the claſs of triple ſalts."

P. 230, l. 5.

Add, "Hence we ſee the neceſſity of diſtinguiſhing this earthy baſe of alum, by the particular name of alumine; becauſe clay, however pure it may be, always contains ſilex."

P. 231, l. 16.

The paragraph No. 5 ends with the word "Paris," and the paragraph No. 6 begins thus: "Alum may likewiſe be extracted from effloreſcent ſhiſti, and volcanic products. I have extracted a conſiderable quantity," &c.

—— l. 8 (from the bottom).

Erase the figure 6.

P. 236.

The note at bottom is omitted.

—— l. 7.

Read, " common clay."

—— l. 20.

Inſert, " Mr. Le Blanc likewiſe obtained theſe cubical cryſtals at pleaſure."

ALTERATIONS AND ADDITIONS IN CHAPTER X.

P. 249, l. 8 (from the bottom).

CANCEL the reſt of the paragraph, and inſert the following:

" To theſe ſix ſalts muſt be added the combinations of barytes, with the tungſtenic, arſenical, molybdic, and ſuccinic acids; but theſe being much leſs known, will be treated of in the hiſtory of theſe four acids.

P. 257, at the bottom of the text.

Add, " Phoſphoric cakes are prepared of this ſubſtance, and the ponderous earth is extracted for chemical experiments."

ALTERATION IN CHAPTER XI.

P. 262.

THE eleventh chapter is omitted in this place, and its materials are applied to the compoſition of two chapters, which come in between chapters VII. and VIII. page 451 of the preſent volume; at which place we ſhall attend to them. — The following chapter is numbered XI.

ALTERATIONS AND ADDITIONS IN CHAPTER XII.

(Numbered XI. in the new edition.)

P. 282.

THE table of the ſix genera of neutral ſalts is drawn out according to the new nomenclature, with the ancient names annexed. In other reſpects it does not eſſentially differ from the table in the preſent edition.

P. 282.

Species VI. of the firſt genus was by miſtake omitted. It conſiſts of "marine acid and fixed mineral alkali, common ſalt, or rather muriate of ſoda."

P. 287, l. 5.

At the word "ſalts," the following note is annexed:

"I do not here ſpeak of the modifications of theſe ſalts, called ſulphites, nitrates, oxigenated muriates, &c. nor of the twenty-eight ſpecies formed by the metallic and bituminous ſalts, which would make the number of neutral ſalts much more conſiderable; beſides which, theſe ſalts do not appear to exiſt in nature."

P. 288, at the bottom.

The Author takes notice that the carbonate of barytes, moſt commonly called aerated ponderous earth by us, has been diſcovered in England perfectly cryſtallized, and in large maſſes.

ALTERATION IN CHAPTER XIII.

(Numbered XII. in the new edition.)

P. 289, l. 13 (from the bottom).

INSTEAD of " peculiar properties," read, " general properties."

ALTERATION IN CHAPTER XIV.

(Numbered XII. in the new edition, by miſtake, inſtead of XIII.)

P. 312, l. 3.

READ, " becauſe the latter, though it diſengages a ſmall quantity of volatile alkali from ammoniacal ſalts in the humid way, does not decompoſe them by diſtillation."

SECTION III.

ALTERATIONS AND ADDITIONS IN CHAPTER I.

P. 326, l. 8 (from the bottom).

AFTER the word "effected," inſert, "It takes place only in proportion as the oxigene loſes the caloric which maintained its aerial ſtate."

P. 327, l. 19.

Add, "The ſtrict and accurate form which the modern doctrine has for ſome years acquired, does not either require, or even permit, our having recourſe to complicated and forced theories: by referring to it in this place, we only add to the perſpicuity and clearneſs of our enunciation."

The two following lines are left out, and the paragraph begins with the words "Vital air is compoſed of a fixable baſe, called the oxigenous principle."

P. 328, l. 1.

Read, "this theory does not ſeem to reject."

—— l. 12 (from the bottom).

The following is added: "Nevertheleſs, there is a great difference between the two theories; the latter (which we admit) poſſeſſes all the characters of accuracy and truth; it is founded on the addition and ſubtraction of weight, which could never be done in the doctrine of Stahl."

P. 329, l. 14.

Add, "or when the igneous principle fixed in a body, and deprived of caloric, paſſes tacitly from that body to another."

P. 330, l. 11.

The words, from "energy" to the full ſtop, are eraſed, and the following ſentence proceeds thus: "But this doctrine does not, &c. neither does it explain, at leaſt in the way of experiment, how certain bodies," &c.

P. 331, l. 7.

Inſtead of "we can ſcarcely avoid thinking," &c. read, "It is ſufficient that it is almoſt demonſtrated that the light is contained rather in the vital air than in the combuſtible body."

ALTERATION IN CHAPTER II.

P. 333, l. 11.

READ, " dug out of the earth."

ALTER-

ALTERATIONS AND ADDITIONS IN CHAPTER III.

P. 344, l. 14 (from the bottom).

READ, " one of its characteriſtic properties is," &c.

P. 346, l. 7 (from the bottom).

Inſert, " for it is eaſy to conceive, from all that we have already ſhewn, that the caloric and the light are diſengaged from vital air and hydrogenous gas during their combuſtion: it is to this diſengagement that we muſt attribute the weight of the water, compared with that of the oxigenous and hydrogenous gas; this fluid is ſpecifically heavier than hydrogenous gas, as 11050 to 1, ſuppoſing that of the gas to be as 13 to 1, compared with common air: the ratio will be much greater if we aſſume the levity of the hydrogenous gas as 16, which appears to be the caſe when it is perfectly pure."

P. 347, after line 12 (from the bottom).

Inſert, " The proportion of the component parts of water, according to the moſt accurate experiments, is 85 parts of oxigene, or the baſe of vital air, and 15 of hydrogene, or the baſe of inflammable air, both by weight."

P. 347.

Read the laſt paragraph thus: "With reſpect to the firſt queſtion, chemiſts are at preſent nearly agreed concerning the identity of inflammable gas, obtained from very different ſubſtances, which appear to poſſeſs various properties."

P. 348.

Inſtead of the firſt three lines, read, "There are indeed ſome who ſtill are of opinion, that ſeveral ſpecies really exiſt; ſuch, according to them, are the inflammable air obtained from iron and zinc by water, which burns," &c. as in line 6 to 15; after which, the reſt of the paragraph, ending with the words "other bodies," upon page 349, is thus altered: "But an accurate analyſis has ſhewn, that theſe two laſt are compounds of pure detonating inflammable gas, with the azotic gas, or carbonic acid, in different proportions; and we were inclined to think, with the illuſtrious Macquer, in 1782, that there is only one ſubſtance of this kind capable of various modifications by its combinations with different matters. The labours of a great number of celebrated philoſophers, and in particular of Meſſrs. Cavendiſh, Prieſtley, Watt, Kirwan, Lavoiſier, Monge, Berthollett, De Morveau, &c. have confirmed this opinion. The mixtures of the foreign gaſes before pointed out, the diſſolution of charcoal, of ſulphur, and of phoſphorus in hydrogenous gas, whoſe ſpecific gravity they augment while they diminiſh its combuſtibility, announce that the apparent differences of inflammable gaſes are owing to theſe mixtures or combinations. I think, therefore, that it may at preſent be conſidered as demonſtrated, that there is but one ſingle ſpecies of inflammable gas always ariſing from the decompoſition of water, forming it again by its union with vital air; and, in a word, that there exiſts in this genus hydrogenous gas only, which exhibits more or leſs inflammability, and various colours in its combuſtion, accordingly as it is mixed or combined with other different ſubſtances.

P. 350, l. 15.

Read, " as well as ſome other ſimilar experiments, which ſeveral philoſophers have oppoſed to our doctrine."

P. 350, l. 9 (from the bottom).

Read, " However this may be, we ſhall here admit that it would be poſſible to explain the phenomena of chemiſtry by admitting hydrogene for phlogiſton; but we muſt at the ſame time obſerve, that this theory of phlogiſton requires forced ſuppoſitions, and that it is very far from appearing as ſimple, as ſatisfactory, as that which we have adopted as the immediate reſult of the facts.*

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* Conſult the tranſlation of Mr. Kirwan's work, and the notes we have added.—Note of the author.

No chemiſt has yet ſucceeded in ſeparating the principles of inflammable gas, and conſequently it is a ſimple ſubſtance," &c. as in line 7, page 351.

P. 352, l. 8.

Add, "which circumſtance has cauſed it to be conſidered as the calx or oxide of a peculiar metal ſtill unknown."

ALTERATIONS AND ADDITIONS IN CHAPTER IV.

P. 356 (at the bottom of the text).

ADD, "by Mr. Deyeux."

P. 363, l. 2.

Read, "than with ſulphur."

P. 367, l. 1.

Inſert, "I have ſeen a preparation of this nature which has been made fifteen years; it ſtill preſerves much of its colour and ſmell, and affords an abundant precipitation by acids. Calcareous liver of ſulphur," &c.

P. 371, l. 12.

Eraſe the full ſtop; and in line 13, after the words "Mr. Prouſt," add a full ſtop, and inſert, inſtead of the four following lines, "The oxigenated muriatic acid, poured in a large quantity upon a ſolution of alkaline liver of ſulphur, precipitates little or nothing, becauſe it re-diſſolves the ſulphur by virtue of its oxigenous principle, which, being nearly at liberty, unites quickly to this combuſtible body, and converts it into the ſulphuric acid. This fact may be ſhewn, in the moſt convincing manner, from an experiment I have made, of pouring into it a mixture of barytic muriate,

riate, or combination of ponderous earth with marine acid, which produces an abundant precipitate of the ſulphate of barytes, or ponderous earth combined with vitriolic acid."

P. 375, l. 1.

Inſtead of "becauſe," &c. read, "but the ſulphureous or volatile vitriolic acid ſeparates its ſulphur, becauſe its oxigene, being partly at liberty, ſeizes more readily upon the hydrogene of the gas."

P. 375, l. 10 (from the bottom).

The reſt of the ſentence, after the word "diſtilled," is left out.

P. 378, laſt line but one.

Add, "And in fact, this opinion agrees with all the modern experiments, which ſhew the ſulphureous acid differs from the ſulphuric or denſe vitriolic acid, in no other reſpect, but in containing a greater proportion of ſulphur."

P. 388, l. 9 (from the bottom).

Add, "though it may be eaſily conceived that the effect of the exploſion ſhould be directed equally on all ſides or circularly."

ALTERATION IN CHAPTER V.

On Plumbago.

P. 391.

THIS chapter is omitted in the preſent place, and its ſubſtance is transferred to page 290 of the third volume, in the chapter on Iron; at which place we ſhall ſpeak of thoſe alterations.

ALTERATIONS AND ADDITIONS IN CHAPTER VI.

P. 400.

On Metallic Subſtances in general.

THIS chapter is numbered V. in the new edition.

P. 426, l. 12 (from the bottom).

Add, "But as no one has proved the identity of light, and that which Stahl called phlogiſton, nor the exiſtence of light in combuſtible bodies, the opinion of Macquer is purely an hypotheſis, which may be entirely paſſed over, and which it is no longer allowed to admit."

P. 428, l. 13 (from the bottom).

After the word "heat," inſert, "by vital air, whoſe oxigene they abſorb, by alkalis, which ſeparate the metallic oxides," &c.

—— l. 8 (from the bottom).

Inſtead of "produced," read, "diſengaged during its action on theſe ſubſtances."

—— l. 4 (from the bottom).

For "all chemiſts," read, "the modern chemiſts."

P. 429, l. 11 (from the bottom).

Read, "ſolutions in the ſulphuric and nitric acids." And add, "The metallic muriates, or combinations of metals with the marine acid, are many of them volatile."

P. 434.

In the firſt diviſion of ſemi-metals, "molybdena and tungſten" are inſerted immediately after "arſenic."—The reſt of the arrangement continues as before.

ALTERATIONS AND ADDITIONS IN CHAPTER VII.

(Numbered VI. in the new edition.)

P. 438, laſt line.

FOR "think," read, "have proved."

P. 439, l. 14.

For "calx," read, "regulus."

—— l. 18.

Inſert, "by a kind of effloreſcence."

P. 442, l. 7.

"We ſhall only remark, in this place, that the oxide of arſenic deprives the nitric acid of great part of its oxigene."

P. 444, l. 9 (from the bottom).

"But it is to Scheele, as we ſhall preſently obſerve, that we are indebted for an accurate knowledge of theſe new combinations."

P. 451.

After the chapter on Arſenic, on account of the additions, alterations, and tranſpoſitions in the matter of chapter XI. page 262, which enters into chapter VII. and VIII. of the preſent ſection, the Editor has choſen, for the convenience of the reader, to give the whole together in this place, rather than mark all the changes, which would ſcarcely have been more conciſe.

CHAPTER VI.

P. 451.

[This chapter is transferred, with conſiderable alterations and amendments, from page 262.]

Concerning Molybdena and the Molybdic Acid.

"WE give the name of molybdena to a new ſemi-metal, diſcovered by Mr. Hielm, and obtained from a mineral ſubſtance known by the ſame name. This ſubſtance muſt not be confounded with common black lead, plumbago, or black chalk which is uſed in drawing, and is at preſent denominated carbure of iron: this confuſion has certainly occaſioned ſome difference of reſults in the labours of thoſe chemiſts who have examined this ſubſtance, from the time of Pott to that of Scheele. It muſt be obſerved, that the carbure of iron, or plumbago, being much more common than molybdena, very few ſpecimens of which are to be met with in cabinets of natural hiſtory, chemiſts have almoſt always made their experiments with the former, Meſſrs. Quiſt and Scheele excepted.

The true ore of molybdena is not eaſily diſtinguiſhed from carbure of iron, in its external characters: nevertheleſs, the molybdena is rather fatter to the touch. It is compoſed of hexagonal ſcales, of greater or leſs ſize, very ſlightly adhering to each other: it ſoils the fingers, and leaves traces upon paper, which are blueiſh or of a ſilvery grey colour. When it is reduced to powder, which is difficult to be performed, on account of the elaſticity of its ſcales, it has a blueiſh colour: it yields eaſily to the knife, is not brittle, and has not the granulated texture of carbure of iron. In order to pulverize the ore of molybdena, it is neceſſary, after the proceſs of Scheele, to throw a ſmall quantity of ſulphate of potaſh (vitriolated tartar) into the mortar along with it; the powder muſt afterwards be waſhed with hot water, which carries off the ſalt, and the mineral remains pure. The analyſis of this mineral, made by different means, proves that it is a compound of ſulphur and the ſemi-metal which we are now examining. This laſt, however, is very difficult to be obtained: the illuſtrious Scheele did not ſucceed in reducing its oxide or calx into metal, either with black flux and charcoal, or with borax and the ſame combuſtible ſubſtance, nor with oil. Bergman affirms, that Mr. Hielm has been more fortunate, and that he ſucceeded in obtaining a ſufficient quantity of the ſemi-metal to exhibit its properties; but ſince the time of this note of Bergman, Mr. Hielm has publiſhed nothing on the ſubject *. Mr. Pelletier, in his experiments

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* A paper of Mr. Hielm, on this ſubject, has been lately publiſhed in the Journal de Phyſique, for May, 1789, tranſlated

riments on the reduction of the oxide and acid of molybdena, never obtained a button of molybdena, but an agglutinated, blackiſh, friable ſubſtance, poſſeſſing the metallic brilliancy: by the magnifier, ſmall, round, brilliant, and greyiſh grains were ſeen, which Mr. Pelletier conſiders as the metal or pure molybdena. Manganeſe likewiſe has not yet been obtained, except in the form of globules.

The following are the properties which have been obſerved, in conſequence of the trials made of this ſemi-metal. Molybdena is grey, in the form of ſmall agglutinated grains, brittle, and extremely infuſible: when heated in contact of air, it changes into a white oxide, which is volatile, and cryſtallizes by ſublimation into brilliant needle-formed priſms, reſembling thoſe of antimony. This oxide, when ſuperſaturated with oxigene, becomes acid, and is the ſaline product which is beſt known, in conſequence of the reſearches of Scheele. The nitric acid readily calcines, and

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tranſlated from the Swediſh Tranſactions. It contains an account of the habitudes of the calx of manganeſe, with ſome of the metals, and an account of ſome trials to reduce it. The regulus, which was ſent to Bergman, was obtained as follows: Vegetable alkali was neutralized by repeated fuſions with bullock's blood; the earth of molybdena was heated with a ſmall quantity of greaſe, which gave it the appearance of a black powder. Equal parts of this alkali, and of microcoſmic ſalt, together with a ſmall quantity of black flux, were uſed for the reduction, common ſalt being uſed ſometimes to cover the whole, and ſometimes mixed with it. The fuſion was made in a covered and luted crucible, expoſed to the heat of a good furnace for ſeveral hours. — Note of the Tranſlator.

converts it into a white oxide, and even into molybdic acid. The oxide of molybdena becomes blue and brilliant during its tranſlation to the metallic ſtate. Alkalis, aſſiſted by the action of water, calcine and diſſolve this ſemi-metal; it is capable of uniting with lead, copper, iron, ſilver, and forms granulated, greyiſh and very friable alloys. Laſtly, when combined with ſulphur, it conſtitutes the ſulphure of molybdena, a compound which is perfectly ſimilar to the ore of this metal, improperly known by the names of molybdena and potlot. As it is this laſt ore which has been the ſubject of the experiments of Scheele, and as it is with this mineral, which is much better known than the metal it contains, that this chemiſt prepared the acid of molybdena, we ſhall proceed to examine its properties more at large. Potlot, or native ſulphure of molybdena, expoſed to heat in an open veſſel, gives out ſulphur, and evaporates almoſt totally in the form of a white ſmoke: expoſed to the flame of a lamp, urged by a blow-pipe, in the metallic ſpoon, it emits the ſame fumes, which are condenſed into yellowiſh cryſtalline blades, and aſſumes a blue colour, by the contact of combuſtible ſubſtances. Mr. Pelletier having calcined the ſulphure of molybdena in a crucible covered by another crucible, obtained white, brilliant, needle-formed cryſtals, ſimilar to thoſe which are called the ſilvery flowers of antimony. This ſublimed oxide of molybdena already poſſeſſes the characters of an acid; but this proceſs would be too tedious and expenſive to be uſed in the preparation of the acid of molybdena.

Saline earths and fixed alkalis, fuſed with the ſulphure of molybdena, diſſolve both the ſulphur and the metal.

Some acids produce remarkable alterations in this ore.

The concentrated ſulphuric acid oxides or calcines the metal, and flies off in the form of ſulphureous acid, by the aſſiſtance of a boiling heat.

The muriatic acid has no action on this mineral.

The arſenical acid, diſtilled from the ſulphure of molybdena, yields its oxigene to part of the ſulphur, which becomes ſulphureous acid. It is volatilized in the form of orpiment with part of the ſame ſulphur, changes a portion of the molybdena into the molybdic acid, and leaves the greateſt part in the metallic ſtate. Mr. Pelletier concludes, from this experiment, that molybdena exiſts in the metallic ſtate in its ore.

By diſtilling 30 ounces of nitric acid diluted with water, from 1 ounce of molybdena, at five ſucceſſive operations, that is to ſay, 6 ounces of the acid at a time, a great quantity of nitrous gas is diſengaged, and a white powder remains in the retort, which muſt be waſhed with a ſufficient quantity of cold diſtilled water to carry off the foreign acid, which is ſoluble at this temperature. After the edulcoration, there remain 6 ½ drachms of the pure molybdic acid. Scheele, to whom this diſcovery is due, thinks that the nitric acid ſeizes phlogiſton, and eſcapes in red vapours; it likewiſe burns the ſulphur which exiſts in the molybdena, and hence it is that the water employed in waſhing the acid of molybdena, contains ſulphuric acid; which may be obtained in a concentrated ſtate by evaporation, and holds a ſmall quantity of molybdena in ſolution. This ſubſtance gives a blue colour of conſiderable brilliancy to the liquor. We are of opinion, that, in this operation, as well as in all thoſe in which the nitric acid, diſtilled from any ſubſtance whatever, reduces it into the ſtate of acidity, the former is decompoſed; and that it is to the ſeparation of the oxigene of the nitric acid, and its fixation in the molybdena, that the diſengagement of the nitrous gas and the formation of the ſulphuric and molybdic acids, are owing.

The acid of molybdena, obtained by the proceſs we have juſt deſcribed, has the form of a white powder, of a ſlightly acid and metallic taſte. When heated in the ſpoon by the blow-pipe, or in the crucible with the contact of air, it is volatilized in a white fume, which is condenſed in needle-formed cryſtals, at the ſame time that part is melted on the ſides of the crucible: notwithſtanding the edulcoration, it retains a portion of ſulphureous acid, which a ſtrong heat completely diſengages.

This acid is ſoluble in boiling water. Scheele diſſolved a ſcruple in 20 ounces of water: this ſolution has a ſingularly acid and almoſt metallic taſte; it reddens the tincture of turnſole, decompoſes the ſolution of ſoap, and precipitates alkaline ſulphures, or livers of ſulphur. It becomes blue and conſiſtent by cold.

The molybdic acid diſſolves in great quantities in the concentrated ſulphuric acid, by the aſſiſtance of heat. This ſolution aſſumes a fine blue colour, and becomes thick by cooling. Both phenomena may be made to diſappear by heat, and re-appear again in proportion as the fluid cools. If the combination be ſtrongly heated in a retort, the ſulphuric acid is volatilized, and the molybdic acid remains in a dry ſtate at the bottom of the veſſel.

The nitric acid has no action on the molybdic acid.

The common muriatic acid diſſolves a large quantity. This ſolution affords a reſidue of a deep blue colour, when diſtilled to dryneſs. If the fire be more ſtrongly urged, the reſidue affords a white ſublimate, and another blueiſh; a grey reſidue remaining in the retort. The ſublimate is déliqueſcent, and colours metals blue; the muriatic acid paſſes oxigenated in the receiver. It is eaſy to underſtand, that, in this operation, the muriatic acid deprives the molybdic acid of a portion of oxigene, and that a portion of this acid paſſes to the ſtate of molybdena.

The molybdic acid, by the aſſiſtance of heat, decompoſes the alkaline nitrates and muriates, by diſengaging their acids, and forms with their baſes neutral ſalts, whoſe properties Scheele did not examine. This acid likewiſe diſengages the carbonic acid from the three alkalis, and forms neutral ſalts with their baſes.

Though Scheele has not made us acquainted with all the properties of the neutral ſalts which we deſign by the names of molybdates of potaſh, of ſoda, of ammoniac, &c. he has nevertheleſs pointed out three, which are ſufficient to characterize their ſtate of neutralization. He has diſcovered, 1. That fixed alkali renders the acid earth of molybdena more ſoluble in water. 2. That this ſalt prevents the acid of molybdena from volatilization by heat. 3. That the molybdate of potaſh falls down by cooling in ſmall cryſtalline grains, and that it may likewiſe be ſeparated from this ſolvent by the ſulphuric and muriatic acids.

The acid of molybdena decompoſes the barytic nitrate and muriate. The barytic molybdate, formed in theſe operations, is ſoluble in water.

The acid of molybdena appears partly to decompoſe the ſulphate of potaſh, or vitriolated tartar, and diſengages a ſmall quantit yof ſulphuric acid, by a ſtrong heat.

The molybdic acid diſſolves ſeveral metals, and aſſumes a blue colour in proportion as this acid abandons to them part of its oxigene. It precipitates ſeveral metallic ſolutions."

CHAPTER VII.

[This chapter, which is transferred from page 269, with conſiderable alterations and amendments, is inſerted immediately after the foregoing.]

Concerning Tungſten and the Tungſtic Acid.

"THE mineral named Tungſten by the Swedes, and called ponderous ſtone, lapis ponderoſus, by ſeveral naturaliſts, and in particular by Bergman in his Sciagraphia, was conſidered by Cronſtedt as a ſpecies of iron ore, and diſtinguiſhed by him under this deſcription: *ferrum calciforme terrâ quâdam incognitâ intimè mixtum.* Moſt of the German naturaliſts arranged it among the ores of tin, under the name of white tin cryſtals, or zinnſpath; and in almoſt all collections of natural hiſtory, it was exhibited as belonging to that metal.

The accurate analyſis of this mineral was not attempted before Scheele; this chemiſt having examined this pretended tin ore, diſcovered by his experiments that it was compoſed of a peculiar acid united to lime. Bergman likewiſe found the ſame reſults by a connected ſeries of experimental enquiries. This diſcovery was made in the year 1781.

Since this time Meſſrs. D'Elhuyar*, of the Royal Society of Biſcay, Mr. Angulo, of the Academy of Valladolid, and Mr. Crell, have repeated the experiments of the Swediſh chemiſts, and confirmed their reſults. After the definition we have given of this natural ſalt and its acid, we muſt obſerve that that which the Swedes called tungſten is a ſalt formed by the tungſtic acid and lime. We adopt this name of tungſten for the ſemi-metal, which appears to be the baſe of this acid, and we ſhall call this ſpecies of mineral, the native tungſtate of lime.

Meſſrs. D'Elhuyar, of the Biſcayan Society, have diſcovered that wolfram, which was formerly conſidered as a poor ore of iron, is a combination of this acid of tungſten with mangaueſe and iron. They obtained a peculiar regulus from this ſemi-metal. The wolfram they uſed came from the tin mine of Zinwalde. It is in compreſſed hexahedral priſms; it has the metallic brilliancy, plated fracture, and may be cut with a knife. It contains in the quintal 22 parts of black oxide of mangaueſe, 12 of the oxide of iron, 64 of the tungſtic acid, and 2 of quartz. The native tungſtate of lime from Schleckenwalde in Bohemia, contains, according to them, 68 parts of tungſtic acid, and 30 of lime.

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[*] The name is ſpelled De Luyartt in Cullen's tranſlation of their Analyſis of Wolfram, publiſhed in London in the year 1785.

Theſe are the two known ores of the new ſemi-metal which we call tungſten. Meſſrs. D'Elhuyar fuſed 1 part of wolfram with 4 parts of the carbonate of potaſh or mild vegetable alkali; they lixiviated this mixture; the water diſſolved the tungſtate of potaſh, or combination of the alkali with the acid of tungſten, and they precipitated this acid in the form of a yellow powder by the addition of nitric acid. This precipitate, urged by heat in a crucible with charcoal, afforded a metallic button compoſed of a number of ſmall friable globules. The following are the properties obſerved in this new ſemi-metal: a conſiderable ſpecific gravity, though never exceeding 17,6; very great infuſibility, which appears to exceed that of manganeſe; indiſſolubility in the three ſtrongeſt acids, and even in the nitro-muriatic acid, or aqua regia; an eaſy union with ſome metals, particularly with iron and ſilver, whoſe properties it ſingularly alters; a facility of oxidation or calcination, by which it is converted into a yellow oxide, which becomes blue by heat; it is indiſſoluble in acids, ſoluble in alkalis, remains ſuſpended in water by trituration, and reſembles an emulſion. Though ſome of theſe characters be analogous to thoſe of molybdena, as Bergman and Scheele had before ſhewn in the molybdic acid, their union is nevertheleſs ſufficient to cauſe tungſten to be conſidered as a peculiar ſemi-metal. But many experiments are ſtill wanting for the exact determination of all its properties.

The chemiſts who have employed themſelves on this inquiry have made many more reſearches on the native tungſtate of lime, than on the ſemi-metal which Meſſrs D'Elhuyar have obtained. In order to exhibit the whole of their diſcoveries on this mineral, it is neceſſary that we ſhould dwell for ſome time on its properties.

The tungſtate of native lime has been hitherto ſcarce; it is found in the iron mines of Bitzberg, in the tin mines of Schleckenwalde in Bohemia; and moſt of the white tin cryſtals of Sauberg near Ehrenfriendersdorf, are tungſtate of lime: ſo that, by aſſaying the white tin cryſtals preſerved in collections by the methods we ſhall point out, it will be eaſy to diſcover ſome ſamples whoſe nature was not ſuſpected.

The tungſtate of lime is not ſenſibly altered by heat; it decrepitates, and is reduced to powder by the action of the blow-pipe, but it does not melt. The blue flame colours it ſlightly, and nitre deprives it of this colour.

Boiling water has no action upon the powder of this metallic ſalt, and it is perfectly inſoluble. The action of the air, the ſalino-terreſtrial ſubſtances, and the cauſtic alkalis upon this ſubſtance are not known.

The ſulphuric acid, heated and diſtilled upon the native tungſtate of lime, comes over without alteration; the reſidue aſſumes a blueiſh colour; by waſhing with boiling water, a ſmall quantity of calcareous ſulphate or ſelenite is obtained, which proves that this ſubſtance contains lime, and that the ſulphuric acid decompoſes only a very ſmall portion.

Diluted nitric acid acts upon this ſalt by the aſſiſtance of heat, but without ſenſible efferveſcence. This acid gives it a yellow colour, which diſtinguiſhes it from the true ore of tin, and it decompoſes this ſubſtance by ſeizing its lime; about twelve parts of nitric acid in the ſtate of ordinary aqua fortis are required for the complete decompoſition of one part of calcareous tungſtate. Scheele performed this operation at ſeveral repeated times. After the action of three parts of weak nitric acid upon one part of this neutral ſalt, he pours two parts of cauſtic volatile alkali, or ammoniac, upon the powder, which the nitric acid had changed to a yellow colour. It becomes white by the action of the alkali; and he repeats this ſucceſſive action of the acid and the alkali, until the whole of the calcareous tungſtate is entirely diſſolved. From four ſcruples, treated in this manner, he had three grains of reſidue, which appeared to be ſiliceous. By precipitation from the nitric acid employed in this ſolution, by the addition of the pruſſiate of potaſh, and afterwards by potaſh itſelf, he obtained two grains of pruſſiate of iron or Pruſſian blue, and fifty-three grains of chalk:

the ammoniac or volatile alkali, by the addition of nitric acid, afforded an acid precipitate. In this experiment, the nitric acid decompoſes the calcareous tungſtate by ſeizing the lime; and the tungſtic acid, which is ſet at liberty by this decompoſition, is ſeized by the ammoniac. The ammoniacal ſalt formed by this laſt ſolution is decompoſed by the nitric acid, which has a ſtronger affinity with the ammoniac than this laſt has with the tungſtic acid. As this laſt acid is much leſs ſoluble than the ammoniacal tungſtate, it falls down, in proportion as it is ſet at liberty, in the form of a white powder. This powder is lixiviated with cold diſtilled water, in order to have the tungſtic acid in a ſtate of purity.

This acid may likewiſe be obtained by another proceſs, which Scheele employed with equal ſucceſs. One part of native calcareous tungſtate in powder is fuſed in an iron crucible, with four parts of carbonate of potaſh; this maſs is lixiviated with twelve parts of boiling water, and nitric acid is poured on until there be no more efferveſcence: the fuſion is then made a ſecond time with four parts of carbonate of potaſh, the matter is again lixiviated with water, and treated with nitric acid until the ceſſation of the efferveſcence; at which time there remains only a ſmall portion of ſilex, and all the tungſten is decompoſed. In fact, during the fuſion the potaſh ſeizes the tungſtic acid, with which it forms a peculiar neutral ſalt, while the carbonic acid unites to the lime, which it changes into chalk. When the melted maſs is lixiviated, the water diſſolves the tungſtate of potaſh, which is much more ſoluble than the chalk, which remains alone; the nitric acid, employed afterwards, diſſolves the chalk with effervеſcence, without affecting that portion of calcareous tungſtate which the firſt four parts of alkali did not decompoſe. At the ſecond operation, the ſalt being completely decompoſed by the other four parts of carbonate of potaſh, the nitric acid ſeizes all the chalk; ſo that, by the aſſiſtance of eight parts of fixed alkali and a ſmall quantity of aqua fortis, ſucceſſively employed, the principles of calcareous tungſtate are entirely ſeparated; its acid is united with the potaſh, and its lime combined with the nitric acid. By precipitating the calcareous nitrate by potaſh, the quantity of lime contained in the calcareous tungſtate made uſe of, comes to be known; and nothing more remains to be done but to ſeparate the tungſtic acid which is united to the fixed alkali. For this purpoſe, the proceſs deſcribed in the firſt experiment is made uſe of. A ſufficient quantity of nitric acid is poured into the lixivium of the melted mixture of tungſtate of lime with the carbonate of potaſh; this lixivium becomes turbid and thick, becauſe the nitric acid having a ſtronger affinity with the fixed alkali than the tungſtic acid has, this laſt is precipitated in powder, and the liquor holds nitre in ſolution. The precipitate is then to be waſhed with cold water, and affords the pure tungſtic acid in the form of a white powder, as in the firſt operation. This proceſs is even preferable to the other, becauſe more eaſy and leſs expenſive *.

The muriatic acid acts upon calcareous tungſtate in the ſame manner as the nitric acid does, and decompoſes it with the ſame energy; and, as it produces a deeper yellow colour, Bergman recommends it for aſſaying and diſtinguiſhing this earthy ſalt.

The tungſtic acid obtained by either of theſe three proceſſes has, as we obſerved, the form of a white powder. By the blow-pipe it becomes yellow, brown, and black, without melting or volatilizing. It is ſoluble in twenty parts of boiling water; the ſolution has an acid taſte, and reddens the tincture of turnſole.

The tungſtic acid appears to form with barytes, a ſalt abſolutely inſoluble in water; and with magneſia, another ſalt of difficult ſolution.

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* The Author has overlooked the determination of Meſſrs. De Luyart, as mentioned in the Tranſlator's note, page 277. They have clearly determined that both theſe white powders contain nitrous acid and alkali, from which foreign admixtures it may be deprived by repeated boiling with nitrous acid, and calcination, as mentioned in the ſaid note.

When its ſolution is poured into lime-water, it produces a ſmall precipitate, which is greatly increaſed by heat, and conſiſts of regenerated calcareous tungſtate according to Scheele.

The tungſtic acid ſaturated with potaſh affords a ſalt which falls down in very ſmall cryſtals, whoſe form has not yet been determined. Scheele does not ſpeak of its combination with ſoda. According to him, it forms, with ammoniac, a ſalt in the form of very ſmall needles: this ammoniacal tungſtate, when expoſed to heat in a retort, lets the ammoniac eſcape, and the tungſtic acid remains in the form of a dry, yellowiſh powder: the ſame ſalt decompoſes calcareous nitre, and again forms the tungſtate of lime.

The tungſtic acid, heated with the ſulphuric acid, aſſumes a blueiſh colour; with the nitric and muriatic acids, it becomes a lemon yellow; with alkaline ſulphur, it affords a green precipitate. Scheele has not determined the cauſe of theſe changes of colour.

This chemiſt having obſerved, that the tungſtic acid readily becomes coloured by combuſtible ſubſtances, and itſelf gives a blue colour to vitreous fluxes, ſuch as borax, &c. heated this acid in a crucible with linſeed oil; but he did not obtain metal, and the acid was only blackened. Bergman, however, was of opinion, from the conſiderable ſpecific gravity of this acid, its coloration by inflammable bodies, and its precipitation by the pruſſiate of potaſh, or Pruſſian alkali, that it is of metallic origin. We have already mentioned the proceſs by which Meſſrs. D'Elhuyar ſucceeded in reducing the tungſtic oxide obtained from wolfram into metallic globules, and the metallic nature of this acid is no longer a problem."

ADDITION IN CHAPTER VIII.

(Numbered IX.)

P. 461, at the end.

INSERT, " A ſympathetic ink is likewiſe made from this ſubſtance."

SUPPLEMENT
TO THE
ELEMENTS
OF
NATURAL HISTORY
AND
CHEMISTRY.

ALTERATIONS AND ADDITIONS IN VOLUME III.

CHAPTER IX.

(Numbered X. in the new edition.)

P. 6, l. 7 (from the bottom).

INSERT, "The ſulphite of biſmuth is not known."

P. 7, l. 9.

Read, "perhaps it may be charcoal."

P. 8, l. 7 (from the bottom).

Add, "The nitrite of biſmuth is not known."

—— l. 7.

For "butter," read, "ſoft ſalt, improperly called butter of biſmuth."

CHAPTER X.

(Numbered XI. in the new edition.)

THIS chapter is not altered.

ALTERATIONS AND ADDITIONS IN CHAPTER XI.

(Numbered XII. in the new edition).

P. 26, l. 5 (from the bottom).

ADD, “ A ſmall portion of this ſubſtance is found in all charcoals.”

P. 27, after l. 13, the following is added: “ Soon afterwards they fall into a black powder, and then reſemble the native oxide or calx of manganeſe.

This rapid oxidation of the regulus of manganeſe by the contact of air, is a fact which I have always conſidered as very ſingular. The metallic globules, which are hard, brilliant, and very refractory, remain entire for a long time in a well-cloſed bottle, provided their ſurface be entire, and covered with that ſmall ſtratum of oxide which is formed during the fuſion of this ſemi-metal: but if one of theſe globules be broken into three or four fragments, we find, by fixing the eye for ſome minutes upon their fracture expoſed to the air, that their colour is quickly altered; that, inſtead of the white colour it had before, it becomes very ſpeedily of a roſe, purple, or violet colour, and at laſt almoſt brown. If the fragments be left in a bottle which contains at the ſame time a certain quantity of air, and they be ſhaken from time to time, it is found, at the end of ſome months, that they are reduced into a powder which is almoſt black. This is a ſort of pulverization, analogous to that of ſaline ſubſtances or pyrites. It proves the ſtrong attraction which exiſts between mangaueſe, and the atmoſpherical oxigene, and the rapidity with which theſe ſubſtances tend to unite."

P. 27, l. 13 (from the bottom).

After the word "ſubſtances," inſert, "Nitre revivifies, or cauſes the ſpeedy re-appearance of this brown or violet colour, by reſtoring the oxigene to the mangaueſe. This is the reaſon why the matraſſes and retorts of white glaſs, which we uſe in our laboratories to obtain vital air from nitre, always acquire a brown or violet colour. Scheele has made," &c.

——l. 9 (from the bottom).

Read, " well known."

P. 28, l. 4.

Inſert, " Scheele has given the name of cameleon mineral to a combination of vegetable alkali and calx of manganeſe, which aſſumes a beautiful green colour in hot water, and is red in cold water. The oxigene and caloric appear to be the principal cauſes of the phenomena preſented by this combination. Perhaps the azote, which I conſider as the alkalifying or alkaligene principle, may diſengage itſelf from the vegetable alkali in this operation, and may partly occaſion theſe ſingular modifications of colour."

P. 28, l. 10.

Read, "This ſulphate is decompoſed by fire, and affords vital air. The alkalis ſeparate an oxide of manganeſe, which becomes blue by expoſure to the air."

P. 30, l. 8.

Add, "It is the cameleon mineral of Scheele, which we have already ſpoken of."

P. 31, l. 8.

The five following lines of the paragraph, and alſo the next paragraph ending with the word "calx," are left out.

—— l. 2 (from the bottom).

The ſentence expreſſing the opinion of Scheele is left out.

P. 32, l. 8.

Add, " and for a great number of other experiments.

This native oxide affords, by mere heat alone in the pneumato-chemical apparatus, very pure vital air, or oxigenous gas. It is this vital air alone which can be uſed to advantage by patients whoſe diſorders require the adminiſtration of this fluid.

The affinity of manganeſe for the principle of combuſtion, ſerves likewiſe to guide modern chemiſts in a great number of caſes."

ALTERATIONS AND ADDITION IN CHAPTER XII.

(Numbered XIII. in the new edition, with which the IIId. volume of that edition commences.)

P. 43, l. 18.

ADD, "The oxigenated muriatic acid oxides antimony with the greateſt facility."

P. 49, laſt line.

Read, "in the ſame manner as inflammable gas;" and leave out the remaining four lines of the paragraph.

ALTERATIONS AND ADDITIONS IN CHAPTER XIII.

(Numbered XIV. in the new edition.)

P. 71, l. 19.

READ, " In this ſtate it is ſometimes confounded with plume alum."

P. 79, l. 15.

Inſert, " by the aſſiſtance of an elevated temperature."

—— l. 18.

Add, " The hydrogenous gas obtained in this proceſs, holds a ſmall quantity of charcoal in ſolution, which comes from the zinc."

P. 80, l. 14.

Read, " which was long unknown, but is found to conſiſt of carbure of iron or plumbago."—And in the following line, read, " inflammable gas, holding a ſmall quantity of charcoal in ſolution."

P. 81, l. 4.

Read, " vitriol of zinc, known in the arts by the name of white copperas, white vitriol, goſlar vitriol, are eaſily," &c.

—— l. 7 (from the bottom).

Read, " After the action of the heat, this ſulphate appears to be converted into ſulphite of zinc, or a ſulphureous ſalt, whoſe properties are not well known. The ſulphate, or vitriol of zinc, is very little altered by expoſure to air, when it is very pure: in the courſe of time, its oxide becomes calcined ſtill more by abſorbing oxigene; it aſſumes a yellow colour, and is no longer perfectly ſoluble in water. This ſulphate, or vitriol of zinc, is decompoſable by alumine or argillaceous earth, barytes, magneſia, lime, and the three alkalis."

P. 84, l. 1.

Read, "blackiſh matter, or carbure of iron."

P. 85, l. 1.

Add, "It may be conceived, that heat diſengaging the nitrous gas of this ſalt, it paſſes to the ſtate of nitrite of zinc. It likewiſe affords a certain quantity of oxigenous gas or vital air."

—— l. 13.

Inſert, "If fuming nitrous acid be uſed in this ſolution, the produce is nitrite of zinc, whoſe properties are not yet exactly known."

—— l. 11 (from the bottom).

Read, "which is nothing elſe but a combination of carbone, or charcoal and iron, or carbure of iron;" and cancel the three following ſentences, which contain the notions of ſeveral chemiſts reſpecting it.

P. 86, l. 4 (from the bottom).

Inſert, "The oxigenated muriate of zinc is not yet known."

P. 90, l. 4.

Inſert, "and which decompoſes the water."

P. 93, l. 7 (from the bottom).

Cancel the four lines, beginning with the words "and the black matter," and ending with the word "ſubſtances."

P. 99, l. 13.

Inſtead of the conjectures which terminate this paragraph, the Author aſcribes the effect in queſtion to the conducting power of the mercury.

ALTERATIONS AND ADDITIONS IN CHAPTER XIV.

(Numbered XV. in the new edition.)

P. 100, l. 5.

READ, "The mercury is ſlightly calcined in this experiment."

P. 109, l. 16.

Read, "appeared to him to conſiſt of mercury."

—— l. 19.

Add, "produced by the air contained in the apparatus."

P. 111, after line 12.

Inſert, "Mercury is infinitely more ſuſceptible of calcination by the contact of air, and many other bodies, than has hitherto been ſuppoſed. A grey blackiſh pellicle is continually formed upon its ſurface, which is a true oxide of mercury.

Heated with the concourſe of air, this metal, at the end of ſome days, becomes changed into a brilliant red powder," &c. as in line 15.

P. 118, l. 1.

The ſix following lines, from the full ſtop to the word "reduction," are left out.

P. 122, l. 10 (from the bottom).

Inſert, after "calx," "Becauſe it cannot become charged with the calx, which is ſuperabundant to its combination, but by means of heat, diſtilled water," &c.

P. 123, l. 5 (from the bottom).

Add, "The exceſs of mercurial calx, which renders the nitric ſolutions capable of being decompoſed by water, is likewiſe attended with a circumſtance which favours this decompoſition; it is, that the oxide is ſo ſtrongly calcined or oxigenated, that it has but very little adherence with the nitric acids."

P. 129, l. 6.

Inſert, "Thoſe which, without having been precipitated by carbonates or cretaceous alkalis, have been merely expoſed to the contact of atmoſpherical air, exhibit the ſame phenomenon, becauſe they always abſorb this acid from the atmoſphere; a property common to all the oxides of mercury, and even to thoſe of ſeveral other metals."

P. 137, l. 4 (from the bottom).

Add, "Becauſe this ſemi-metal being already charged with oxigene, cannot take it from the oxide of mercury, nor conſequently diſengage it from its muriatic combination."

P. 139, l. 5 (from the bottom).

The firſt ſeven lines of this paragraph are eraſed, and the following ſubſtituted inſtead: "This ſublimed muriate of antimony, or the combination of the muriatic acid with antimony, does not take place but in proportion as the ſemi-metal takes the oxigene from the mercury, as we have already obſerved of arſenic. This compound," &c. as in line 3, page 140.

P. 140, l. 9.

After the word "cooling," add, "for which reaſon it has been called butter of antimony."

P. 147, l. 9 (from the bottom).

The reſt of the paragraph is thus altered: "Or, which is the ſame thing, that the calx is much more calcined in the corroſive muriate than in the mild. So that when running mercury is triturated with corroſive mercurial muriate, the mercury ſeizes the exceſs of oxigene of the muriatic acid, or that of the former mercurial muriate: and the more conſiderable doſe of new oxide leſs calcined, which unites to the muriatic acid, cauſes the nature of the ſalt to vary, which becomes leſs ſaline, leſs ſapid, leſs ſoluble, and, in a word, in which the properties communicated to the

mercury

mercury by the oxigene, are weakened in proportion as the quantity of that principle is diminiſhed."

P. 148, l. 14 (from the bottom).

Inſert, "It muſt be obſerved, however, that this ſalt contains a portion of the oxide or calx of mercury, which is not combined with the acid of borax, becauſe of the ſoda, which is in exceſs in the borax of commerce. If pure borax of mercury be required to be had by this proceſs, it will be neceſſary to employ a borax of ſoda perfectly neutral; that is to ſay, the borax of commerce, ſaturated with as much of the acid of borax as it can take up. Sal ammoniac renders," &c.

P. 149, l. 9.

Add, "though the oxides or calces of mercury abſorb, with conſiderable efficacy, the carbonic acid contained in the atmoſphere."

ALTERATIONS AND ADDITIONS IN CHAPTER XV.

(Numbered XVI. in the new edition.)

P. 158, l. 14 (from the bottom).

INSTEAD of the remainder of this paragraph, the following is inſerted: "It muſt be here remembered, that moſt of the cryſtals of white tin ore which are met with in collections, conſiſt of native tungſtate of lime, and that this ſalt muſt not be confounded with the oxide or calx of tin, which does not turn yellow by the contact of acids."

P. 159, l. 11.

Inſert, "Mr. Kirwan affirms that the black tin ore contains $\frac{80}{100}$ of tin and iron."

P. 160, l. 15.

The laſt ſentence of this paragraph is omitted.

P. 165, l. 10.

Inſert, "Notwithſtanding this experiment, the calx of tin is conſidered as infuſible, and it certainly requires a fire," &c.

P. 168, l. 14.

The two following ſentences are eraſed, and the following is inſerted:

"Mr. De Morveau has obſerved, that, in a ſolution of tin by the nitric acid, no gas is diſengaged, but that ammoniac is formed. We ſee, therefore, that the tin not only decompoſes the nitric acid, but likewiſe the water, which uniting to the azote of the nitric acid, forms the ammoniac or volatile alkali produced in this operation."

P. 170, l. 1.

Read, "fetid inflammable gas."

——l. 3.

Inſert, "The water is therefore decompoſed by the tin with the aſſiſtance of the acid."

P. 183, after l. 2.

Inſert the following paragraph: "Mr. Adet, who read a memoir to the Academy upon the fuming liquor of Libavius, has ſhewn, (1) That the efferveſcence, which takes place as often as it is mixed with water, depends on the diſengagement of an elaſtic fluid, which poſſeſſes all the properties of azotic gas: (2) That the fuming liquor, combined with water, in the proportion of 7 to 22, forms a ſolid body, which melts by the action of heat, congeals by cold, and reſembles the oxigenated muriate of tin or butter of

tin:

tin: (3) That the fuming liquor, diluted with water, diſſolves tin without the diſengagement of hydrogenous gas, and affords a ſalt ſimilar to that which is obtained by the direct combination of the muriatic acid and tin. He concludes, from his various experiments, that the fuming liquor is nothing elſe but a compound of the muriatic acid in the aeriform ſtate, and the oxide, or calx of tin in which oxigene predominates; and that this ſalt is the ſame, with reſpect to the common muriate of tin, as the oxigenated muriate of mercury or corroſive ſublimate is to the muriate of mercury or mercurius dulcis.

ALTERATIONS AND ADDITIONS IN CHAPTER XVI.

(Numbered XVII. in the new edition.)

P. 188, l. 10 (from the bottom).

READ, "the name of Saturn, becauſe it abſorbs and devours, as it were, all the imperfect metals in its ſcorification, as we ſhall hereafter ſhew."

P. 194, l. 5.

Inſert, "Mr. De Laumont has given a memoir upon the native phoſphoric ſalt of lead, which is very abundant in Brittany."

P. 204, l. 14.

Add, "Mr. Luzuriaga has obſerved, that by agitating granulated lead in a ſmall quantity of water, with the contact of air, the metal becomes quickly calcined."

P. 210, l. 2.

Inſert, "Nevertheleſs, ſince it has been diſcovered that the calces of lead, and eſpecially the red calx or minium, contain carbonic acid, which they abſorb from the atmoſphere, it is conceived that the ammoniac or volatile alkali, diſengaged by theſe oxides, muſt take up a part."

ALTERATIONS AND ADDITIONS IN CHAPTER XVII.

(Numbered XVIII. in the new edition.)

P. 219, l. 4.

AFTER the word, "ruſt," inſert, "It then forms the ochreous iron ores. All earths which are of a brown or red colour are of this ſpecies.

(3) The iron ores, which are called bog ores, muſt not be confounded with the ochres: theſe ores indeed contain oxided iron; but this oxide is combined with the phoſphoric acid, which appears to ariſe from the decompoſition of vegetables: it is diſtinguiſhed into," &c. as in line 4.

—— l. 10 (from the bottom).

The concluding ſentence of this paragraph is omitted, and the following is added: "Bergman, who was acquainted with this ſtate of iron, without having determined its nature, called this phoſphate of iron ſiderite; ſome German chemiſts have ſince called it water-iron. We ſhall hereafter explain the means of ſeparating this ſalt from iron, which is brittle in the cold.

(4) "The eagle ſtones," &c. and proceed as in line 5 from the bottom.

P. 221, l. 1.

Read, "The load-ſtone is a very hard and very refractory ochreous iron ore."

P. 222, l. 3.

Add, "The manganeſe which it often contains renders it changeable in the air, and cauſes it to aſſume a brown colour, in proportion as it loſes its form and conſiſtence."

P. 225, l. 7 (from the bottom).

Inſert, "The laminated and brilliant iron ore of Fremont likewiſe belongs to this ſpecies."

P. 226.

The paragraph numbered 13 is left out.

P. 229, l. 3 (from the bottom).

Add, "The true cauſe of the brittleneſs, fuſibility, granulated texture, and all the other properties of caſt iron, has been put out of doubt by the valuable reſearches of Meſſrs. Vandermonde, Monge, and Berthollett. They have proved that crude iron contains oxigene and charcoal: this laſt has been abſorbed during the fuſion in the ſmelting furnaces. It is to the ſeveral quantities of theſe two foreign ſubſtances that caſt iron owes its different qualities,

P. 230, l. 7.

Inſtead of the twelve following lines, inſert, "Theſe different characters depend on the quantity of oxigene, and more eſpecially of charcoal, contained in the crude iron. When the charcoal is very abundant, and uniformly mixed, the caſt iron is black; a ſomewhat ſmaller quantity of that ſubſtance forms the grey caſt iron; an imperfect mixture too quickly made, and ſuddenly cooled, conſtitutes ſpeckled iron; and the white crude iron contains the leaſt poſſible quantity of charcoal. All theſe qualities influence the nature and uſe of crude iron, and eſpecially its convertibility into malleable iron. The philoſophers above quoted have diſcovered that when crude iron is fuſed, there is always ſeparated a portion of charcoal intimately united to a ſmall quantity of iron, or carbure of iron. This compound, hitherto called plumbago, covers the ladies with which the caſt iron is taken up and poured out.

To convert crude into malleable iron, it is neceſſary to deprive it of charcoal and oxigene. A ſtrong heat, which thoroughly penetrates the whole maſs, is neceſſary to obtain this reduction. It may be eaſily conceived, that at a high temperature the charcoal muſt burn by ſeizing the oxigene, and will diſengage itſelf with efferveſcence. For this purpoſe it is taken to the refining furnace. This is a hearth ſomewhat hollow, in which a maſs a maſs of crude iron is placed, and covered with a large quantity of charcoal. The fire is urged by bellows until the iron melts, in which ſtate it is wrought or kneaded, and repeatedly turned over with proper inſtruments. This agitation cauſes it to preſent a larger ſurface, ſo that the portions of charcoal take the oxigene from the iron, are burned, and give out carbonic acid gas. The metal appears likewiſe to be deprived of a portion of ſiderite or phoſphate of iron. It is then carried to the hammer," &c. as in line 20.

P. 232, l. 4.

Inſert, "but theſe matters appear to do oftener harm than good."

—— l. 12.

Inſtead of the five following lines, inſert, "The iron being ſoftened and dilated, abſorbs the charcoal which ſurrounds it; and the ſteel of cementation is nothing elſe but a combination of pure and well-reduced iron with charcoal. It differs from iron in containing charcoal, and from pure crude iron in containing not only charcoal, but a greater or leſs quantity of oxigene. If caſt iron be deprived of its oxigene without ſeparating the charcoal, or by giving it a new quantity, ſteel will be produced without refining the iron. Steel is much more fuſible than iron, for which reaſon the bars which are converted into ſteel by cementation, are ſoftened to that degree, that the carbonic acid, which is diſengaged in bubbles during the action of heat, forms ſmall bliſters, or very ſenſible cavities on its ſurface. This kind of ſteel is called bliſter ſteel. The differences of ſteel depend upon the greater or leſs reduction, the quantity of charcoal which it contains, and the more or leſs ſudden cooling it has been ſubjected to. The tempering brings the particles ſtrongly together, and renders it very hard, very dry, and very brittle.

P. 233.

The firſt four lines are left out.

—— l. 7.

Read, " Becauſe that metal being more difficult to fuſe than others, adheres very ſtrongly to oxigene, and has a ſtrong tendency to combine with it.

—— l. the laſt but one of the text.

Read, " and ſo reducible that they melt very readily and eaſily abſorb charcoal in their reduction, for which reaſon they are called ſteel ores."

P. 234, l. 4.

Inſtead of " the pureſt ſteel," read, " the ſofteſt iron."

The firſt ten lines of the following paragraph are left out, and it begins at line 15 with the words " Iron does not melt but by an extreme heat," &c.

P. 234, l. 5 (from the bottom).

Read, " which ariſes from its combination with charcoal."

P. 235, l. 11.

Inſert, " As in all theſe fuſions the iron becomes brittle and is calcined, at the ſame time that it aſſumes a black colour, the workmen in iron, and all who have to do with this metal, do not conſider it as fuſible ; and it is an axiom with them, that iron is abſolutely infuſible. It may be conceived, however, that this opinion, ſtrictly taken, is erroneous ; for by a very ſtrong heat, and without the contact of air, iron melts with ſcarcely any alteration. In our accurate experiments, ſmall ingots of ſoft and ductile iron are obtained. Iron, though very hard," &c. and proceed as in line 12.

—— l. 21.

Read, inſtead of the remainder of the paragraph, " filings of ſteel, and ſtill more quickly the ſcales of hammered iron, to heat under a muffle. They are converted into a reddiſh brown powder, not attractable by the magnet, and called aſtringent ſaffron of Mars. We call it the red oxide of iron, and the ſcales the black oxide. This laſt ſubſtance contains from 20 to 25 parts of oxigene ; the red oxide contains from 32 to 34. The oxides of iron vary between theſe two degrees of oxidation ; ſome are of a yellowiſh brown, others of a chocolate colour, and others of a beautiful red ſimilar to carmine: all theſe oxides or calces, when mixed with earthy matters and expoſed to a very ſtrong heat, melt into a blackiſh and porous glaſs. They are reduced in part by heating them ſlowly in cloſe veſſels: if they have been expoſed for a ſhort time to the air, they give out a certain quantity of carbonic acid during their reduction; which proves that they attract this acid from the atmoſphere. This acid likewiſe comes from the charcoal contained in iron, which becomes acid by abſorbing the oxigene diſengaged during their reduction."

P. 236, l. 15.

For "ſlowly," read, "ſlightly;" and inſtead of the laſt ſentence of the paragraph, read, "But they do not loſe all the oxigene which they contain in this operation, and paſs only to the ſtate of the black oxide or calx."

P. 239, l. 4.

Inſert, "The preparation of lemery is owing to a true decompoſition of the water; hydrogenous gas is diſengaged, and the iron becomes calcined by abſorbing 25 per cent of oxigene. We ſhall immediately proceed to treat more at large of this oxidation of iron by water."

P. 241, at the bottom.

Add, "Of this kind is the experiment which has ſhewn that water is a compound of 0,14 of hydrogene, and 0,86 of oxigene."

P. 242, l. 8 (from the bottom).

Add, " This fluid being decompoſed, affords the gas; and its decompoſition is favoured by alkalis."

P. 243, l. 15.

Read, " Macquer, Bergman and Kirwan think that," &c.

P. 244, l. 13.

Inſert, " This fact is proved becauſe the ſame quantity of alkali is required to ſaturate the acid after its action on the iron, as it would have required before. It is therefore," &c.

P. 248, l. 2.

Read, " publiſhed among thoſe of the Academy for 1785."

P. 252, l. 13.

The note is omitted, and the following paragraph is added:

" This enquiry of the academicians of Dijon has been confirmed by the reſearches of Scheele. This celebrated chemiſt has diſcovered, that a ſimple infuſion of nut-galls in water affords by ſeparation a peculiar cryſtallizable acid, which takes iron from many other acids, and colours it black, becauſe it approaches to the metallic ſtate. We call this ſalt the gallic acid, and ſhall give an account of it in the hiſtory of the vegetable kingdom.

P. 264, l. 10.

Add, " or at leaſt a very ſmall portion of that ſubſtance."

P. 268, l. 5.

The following account of Mr. Berthollett's inquiries into the nature of Pruſſian blue, are inſerted in the new edition:

" Mr. Berthollett has made experiments upon the Pruſſian acid, or colouring matter of Pruſſian blue, ſince all theſe chemiſts. Although the reſearches of this learned philoſopher have not yet proved entirely ſatisfactory to himſelf, they nevertheleſs contain facts and experiments of ſufficient novelty and importance to induce us to inſert, in this place, an extract of his Memoir, which he has had the goodneſs to communicate to us.

Mr. Berthollett, in the firſt place, diſtinguiſhes two kinds of pruſſiate of iron; the one which is the common Pruſſian blue, and the other which is the ſame Pruſſian blue deprived of a portion of the Pruſſian acid. He calls this pruſſiate of iron with exceſs of oxide. Pruſſian blue is in this laſt ſtate, after it has been diſcoloured by an alkali. To ſeparate this exceſs of oxide or calx, he uſes the muriatic acid, which diſſolves it, and leaves the pruſſiate of iron neutral. He obſerves with Mr. Landriani, that, when the alkali is digeſted with heat upon the Pruſſian blue, the alkaline pruſſiate, which is formed, diſſolves more of the oxide of this metal than when the digeſtion is made in the cold. Both theſe chemiſts think that an acid added to this triple combination, unites to the exceſs of oxide of the iron, and cauſes the Pruſſian blue to be depoſited in the ſame manner as when the pure pruſſiate of potaſh is added to a ſolution of iron. They add, likewiſe, that heat cauſes a precipitate to fall down from this combination, which conſiſts of a yellow pruſſiate of iron; that is to ſay, with exceſs of oxide or calx of iron. According to them, the acid which is added ſeizes the exceſs of oxide of iron, and ſuffers the precipitate of Pruſſian blue to fall down, which is then leſs ſoluble in the alkaline pruſſiate. When the pruſſiate of potaſh, prepared by a gentle heat, has depoſited the pruſſiate of iron, with exceſs of oxide of this metal, by ebullition, it may be evaporated to dryneſs, re-diſſolved in water, and mixed with acids, without depoſiting Pruſſian blue. Mr. Berthollett affirms, that, from the evaporation of pruſſiate of potaſh thus purified, octahedral cryſtals are obtained by evaporation; two of whoſe pyramids are truncated in ſuch a manner as to repreſent ſquare plates, whoſe edges are chamfered off.

This chemiſt having mixed a ſolution of theſe cryſtals with the ſulphuric acid, and expoſed the whole in a bottle to the rays of the ſun, ſaw, that a ſhort time afterwards a blue colour was developed, which formed a precipitate until its total decompoſition. A like mixture, preſerved in a dark place, did not become blue, nor afford a precipitate even at the end of ſeveral months: a ſtrong heat produces abſolutely the ſame effect. From theſe experiments, Mr. Berthollett ſhews on what inaccurate information the proceſſes recommended for purifying the alkaline pruſſiates were founded: for, ſaid he, they were decompoſed for the moſt part, inſtead of depriving them of a portion of Pruſſian blue, which chemiſts pretended was only accidentally mixed with it. As the pruſſiate of potaſh is a triple ſalt, the Pruſſian acid has only a very ſlight adheſion to the potaſh, and is ſeparated by all the other acids. In proportion as the foreign acid unites to the potaſh, part of the Pruſſian acid unites to the oxide of iron, forming Pruſſian blue; and the other is volatilized in the ſtate of acid, or reduced to its principles.

The iron which is precipitated by the alkaline pruſſiates, retains, according to Mr. Berthollett, a conſiderable portion of thoſe ſalts: it may be deprived of them by repeated waſhings. Theſe lixiviums contain the alkalis, combined with a ſmall portion of Pruſſian acid; and the pruſſiates, with exceſs of alkali, are not carried off until the exceſs of acid in the ſolution of iron is carried off by the firſt waſhings; for the latter lixiviums precipitate iron in the form of Pruſſian blue from its ſolutions, though the firſt do not.

He did not find any ſenſible difference between the pruſſiates of potaſh and of ſoda, excepting that the latter cryſtallizes differently: the mineral acids diſengage the Pruſſian acid, partly fixed in the Pruſſian blue, which falls down; it is this which engaged Scheele to contrive another combination, from which he could obtain the pure acid with greater facility, and upon which Mr. Berthollett makes, ſome obſervations. This proceſs conſiſts, as we have already obſerved, in boiling the red oxide of mercury in diſtilled water, together with Pruſſian blue; the Pruſſian acid quits the oxide of iron to unite with the oxide of mercury, with which it has a ſtronger attraction, and forms a ſoluble ſalt, which cryſtallizes in tetrahedral priſms, terminated by quadrangular pyramids, whoſe planes anſwer to the angles of the priſm. Iron and concentrated ſulphuric acid are added to the filtrated lixivium; the iron unites with the oxigene of the mercury, and combines with the ſulphuric acid; the mercury falls down with its metallic brilliancy. Scheele afterwards diſtilled this mixture with a gentle heat, in order to volatilize only the Pruſſian acid, but he found that however ſlight the heat was, it always paſſed, mixed with a ſmall quantity of ſulphuric acid. To obviate this difficulty, he added a certain quantity of chalk to fix the ſulphuric acid. Upon this addition, Mr. Berthollett,

thollett takes notice, that, as Scheele did not ſpecify the doſe of this ſubſtance, it was very eaſy to fail in the operation, if the chalk exceeded a little the point of ſaturation of the ſulphuric acid; for calcareous pruſſiate would then be formed, which, by the law of double affinities, would decompoſe the ſulphate of iron.

Mr. Berthollett found that the ſulphuric acid diſengaged only a ſmall quantity of acid from the pruſſiate of mercury; that it united, for the moſt part, with this ſalt, without decompoſing it, and formed a triple ſalt, cryſtallizing in ſmall needles. According to his experiments, the muriatic acid diſengages more acid from the pruſſiate of mercury than the foregoing, and equally forms a triple ſalt, capable of cryſtallizing in needles, and much more ſoluble than the corroſive mercurial muriate. Alkalis and lime precipitate this triple ſalt of a white appearance. Mr. Berthollett proves that the alkaline pruſſiates do not precipitate ponderous earth from its ſolutions, as Bergman had thought, but that they form triple ſalts: he ſhews that they precipitate alumine or argillaceous earth. The precipitate they form with this ſubſtance is not altered by the ſulphuric acid; but, digeſted with the ſulphate of iron, it forms Pruſſian blue.

The Pruſſian acid decompoſes the oxigenated muriatic acid, abſorbs its oxigene, and becomes fragrant. In this ſtate it does not appear to have a great tendency to alkaline ſubſtances, for they ſcarcely diminiſh its ſmell,

ſmell. It does not precipitate iron of a blue, but of a green colour; and this green precipitate is ſoluble in acids. It becomes blue by the contact of the ſun's rays, as well as by the addition of the ſulphureous acid and iron. The ſame phenomena happen when the oxigenated muriatic acid, ſulphate of iron, and pruſſiate of potaſh, are mixed together. Hence Mr. Berthollett thinks that Pruſſian blue is not alterable by light and by the ſulphureous acid, and that it is to the abſorption of oxigene that it owes its green colour, its ſolubility in acids, &c.

If the Pruſſian acid be ſurcharged with oxigenated muriatic acid, and afterwards expoſed to the luminous rays, it aſſumes new characters; it no longer combines with the oxide of iron nor with water, at the bottom of which it flows in the form of oil, and with an aromatic odour. If in this ſtate more oxigene be added, and it be left in the ſun, it cryſtallizes in the form of ſmall white needles. This acid, thus oxigenated, is reduced into vapours at a gentle temperature; theſe vapours are not ſoluble in water, and nevertheleſs are not combuſtible. Mr. Berthollett has not yet been able to determine what paſſes in this operation. Does the Pruſſian acid ſimply unite with oxigene without alteration, or is one of its principles burned? We ſhall more willingly adopt this laſt idea with him, for though the oxigene appears to be only ſlightly adherent to the Pruſſian acid, it can no longer be reſtored when it has been thus treated with the oxigenated muriatic acid.

When the Pruſſian acid has been put in the ſituation to form a green precipitate with iron, by means of the oxigenated muriatic acid, ammoniac is formed as ſoon as it is mixed with alkali or lime. An acid poured into this laſt mixture no longer reſtores the odour peculiar to the Pruſſian acid. Mr. Berthollett concludes that it is deſtroyed. Though he employed perfectly pure potaſh, yet an acid poured on after its action, produces an effervefcence, and diſengages the carbonic acid which has been formed in every part.

Mr. Berthollett concludes, from all theſe experiments, that azote, hydrogene, and carbone united in proportions and with a degree of condenſation which he is unacquainted with, produce that which is called the Pruſſic acid. This compoſition explains the hiſtory of its formation in animal matters, in certain vegetable ſubſtances, and in the ammoniacal muriate, contaminated with charcoal. It likewiſe explains why this acid is ſo combuſtible, and detonates ſtrongly with the ſeveral nitrates; why it affords carbonate of ammoniac by diſtillation; and why this ſalt is formed by the addition of the oxigenated muriatic acid. Mr. Berthollett doubts whether this ſingular combination contains oxigene; at leaſt, ſays he, if the Pruſſian acid contain it, the quantity is not ſufficient to reduce the charcoal entirely into carbonic acid; for the diſtillation of Pruſſian blue affords much carbonated hydrogenous gas.

Such are the facts diſcovered by Mr. Bertholletː by determining the nature of colouring matter of Pruſſian blue, he has aſcertained that it is not a true acid, though it performs the functions of an acid in all its combinations. Mr. Weſtrumb and Mr. Haſſenfratz have diſcovered a ſmall quantity of phoſphoric acid in Pruſſian blue. The latter chemiſt has ſhewn that it is not eſſential to its nature.

Martial vitriol decompoſes nitre very readily," &c. as in page 268.

P. 270, l. 12 (from the bottom).

Add, " And Dr. Prieſtley has reduced the brown oxides of iron by the contact of hydrogenous gas. Theſe experiments do not contradict our doctrine, but, on the contrary, they ſerve to confirm it. In fact, the hydrogene deprives the iron of all the oxigene it was united with beyond the quantity of 0,28: this laſt doſe is merely that which the oxigene cannot ſeparate. Hence it is that, in theſe reductions, nothing but a black oxide or martial ethiops is obtained, and hence water never oxides iron, but to a black colour.*

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* It may be obſerved, however, as a correction to this explanation, that Dr. Prieſtley not only revived iron which

P. 274, l. 12.

Add, " if it be not extracted in the apparatus of Woulfe."

P. 276, l. 10 (from the bottom).

Inſtead of "renders it more probable," read, " it is proved."

—— l. 6 (from the bottom).

After the word " water," inſert, " for the acid remains entire, and without decompoſition, and requires the ſame quantity of alkali to ſaturate its ſolution as before. The ſolution of iron," &c.

P. 278, l. 6.

Strike out the words " and ſeems to deſerve the name of butter of iron."

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which had been calcined by the burning glaſs in the open air, but likewiſe that which had been calcined by the ſteam of water (vol. vi. p. 126). The fact, therefore, according to the antiphlogiſtic theory, will ſtand thus: metallic iron, in a red heat, ſeparates the oxigene of water from its hydrogene; and this combination of oxigene and iron is again decompoſed by hydrogene, which in its turn takes the oxigene from the iron. It remains, therefore, to be ſhewn upon what circumſtance this alternate predomination of affinity to the oxigene depends. It does not appear to depend on temperature, which, as far as the facts have hitherto been examined, is much the ſame in both caſes. Neverthelefs, it muſt be confeſſed, that the difficulty is equally great in the phlogiſtic theory; for, in this, the calx of iron will attract firſt water, and then phlogiſton, without any evident cauſe why it ſhould do ſo. Future experiments muſt decide the queſtion.—Note of the Tranſlator.

P. 279, at the end of the note.

Add, "The iron ore of Framont is of the ſame nature."

P. 284, l. 9 (from the bottom).

Inſtead of the following ſentence, read, "The black calx of iron is not decompoſed by this gas; but the brown or red calces are eaſily changed, and paſs to the ſtate of black oxide, becauſe they yield to the hydrogene the quantity of oxigene which is ſuperabundant to that which places the iron in the ſtate of black calx."

P. 286, l. 12 (from the bottom).

Inſert, "Neverthe leſs, this inflammation may take place without the contact of air."

P. 290, l. 17.

In this place the Author has inſerted the ſubſtance of the fifth chapter of part the ſecond, from page 391, vol. ii. The ſubject begins thus:

"We have ſeen, at the commencement of this chapter, that iron readily abſorbs charcoal by heat, and that it forms crude or caſt iron and ſteel by its union with this combuſtible ſubſtance; with this difference, however, that it contains oxigene in the former of theſe compounds, but not in the latter. In both, the quantity of iron greatly exceeds that of the charcoal. The chemical analyſis, which is ſo much indebted to the labours of Scheele, has proved to this chemiſt, that plumbago, a mineral whoſe nature and rank among other minerals had long embarraſſed philoſophers, is nothing more than a combination of a large proportion of charcoal with a very ſmall quantity of iron; its hiſtory muſt, therefore, belong to that of this metal.

Plumbago was a long time confounded with molybdena. Pott is the firſt who proved that neither of theſe ſubſtances contains lead, as was anciently thought. The many names by which," &c. as in page 392, vol. ii.

The Author has not altered the reſt of the tranſpoſed chapter in any eſſential particular, except by adding the following lines in page 398, vol. ii. line 2, after the word "ſubjected:" "Since the knowledge acquired reſpecting carbure of iron by the reſearches of Meſſrs. Vandermonde, Monge, and Berthollett, into the different ſtates of this metal, they have diſcovered that a ſubſtance is daily formed in the fuſion of caſt iron, which is entirely ſimilar to the native carbure of iron or plumbago. It is rare that the ladles with which the crude iron is taken out are not covered with it. The ruins of the ſmelting furnaces which are repaired, exhibit it likewiſe in conſiderable maſſes, in a cryſtallized form. It is to be hoped, that at ſome future period it may be artificially prepared for the uſes of ſociety."

P. 293,

P. 293, l. 17.

Inſtead of the concluding paragraph of this chapter, the following is inſerted:

"Iron which poſſeſſes the magnetic property, or the artificial magnet, has been reckoned among thoſe bodies which produce very ſingular effects upon the animal œconomy. When applied to the ſkin, according to ſeveral modern authors, it mitigates pain, diminiſhes convulſions, excites redneſs, ſweat, and often a ſmall eruption: it is likewiſe capable of rendering epileptic attacks leſs frequent. It has even been affirmed, that, when left in water for twelve hours, it communicates a purgative property to that fluid. All theſe aſſertions, which are ſaid to be founded on facts, ſufficiently announce to enlightened philoſophers the great difficulty which attends phyſical reſearches into the animal ſyſtem. The abſolute inefficacy of a body, rendered magnetical or armed with the magnetical power, upon other bodies which are not ſuſceptible of receiving the ſame power, truly excludes the influence of magnetiſm upon the animal œconomy: thoſe phyſicians who attribute ſuch evident and ſtriking effects, and conſequently ſuch energetic medicinal properties to the magnet, have been ſeduced and deceived by changes more or leſs ſenſible, which have taken place at the time of the application of the magnet, and were owing to the proper forces of the individuals,

dividuals, and the happy efforts of nature. This opinion is ſo much the better founded, as it is more eſpecially in the ceſſation or tranſpoſition of local pains or convulſions, that nature exhibits the greateſt inconſtancy and irregularity to obſervers; and that it is particularly from ſymptoms, more or leſs analogous to theſe, that the pretended medicinal properties of the loadſtone have been inferred."

ALTERATIONS AND ADDITIONS IN CHAPTER XVIII.

(Numbered XIX. in the new edition.)

P. 297, l. 13.

THIS paragraph is transferred to the end of paragraph numbered 3, in page 298.

P. 308, l. 12 (from the bottom).

Add, " But neither the one nor the other of theſe ſalts does any thing more than favour and accelerate the precipitation of atmoſpheric oxigene upon the copper, for this calcination of the metal does not take place without the tact of air.

This fact is more eſpecially remarkable in the action of ammoniac or volatile alkali, which diſſolves copper with conſiderable rapidity. This ſalt, digeſted upon copper filings with the contact of air, produces, at the end of a few hours," &c. as in line 8 from the bottom.

—— l. 3 (from the bottom).

After the word " copper," inſert, " the bottle was frequently opened."

P. 309, l. 15.

After the word "deeper," inſert, "We manifeſtly ſee the influence of atmoſpheric oxigene in theſe phenomena."

P. 315, l. 3.

Inſtead of this ſentence, read, "Only a ſmall quantity of hydrogenous gas is diſengaged during this ſolution."

P. 317, l. 2 (from the bottom).

The ſentence beginning with the words "this experiment," is left out.

CHAPTER XIX.

(Numbered XX. in the new edition.)

THIS chapter is not altered.

ALTERATIONS AND ADDITIONS IN CHAPTER XX.

(Numbered XXI. in the new edition).

P. 355, l. 7 (from the bottom).

AFTER the word "heavy," inſert, "platina excepted."

P. 358, l. 3 (from the bottom).

Read, "extracted by eliquation, cupellation, and parting. The lead which flows during the eliquation of the copper, carries the ſilver and the gold with it. Cupellation," &c. as in line 1 of the following page.

P. 370, l. 3.

Inſert, "Mr. Berthollett has diſcovered that the oxigene or calx of ſilver, precipitated from the nitric acid by lime, and digeſted with ammoniac, which ſeparates it when the oxide has aſſumed a blackiſh colour, acquires the property of detonating, not only by a heat very little ſuperior to that of boiling water, but likewiſe by the mere friction of any ſubſtance in the ſlighteſt manner. This fulminating ſilver is much more remarkable than even that of gold, whoſe fulmination is owing to the ſame cauſe. The volatile alkali, decanted from this calx, depoſits, by ſlow evaporation, ſmall brilliant and lamellated cryſtals, which have the fulminating property, even at the bottom of the water, by ſimple friction."

ALTERATION AND ADDITION IN CHAPTER XXI.

(Numbered XXII. in the new edition.)

P. 385, l. 16.

INSERT, "Late experiments have ſhewn, that platina exceeds gold in weight, when it has been purified by a long fuſion."

P. 387, l. 13.

Read, "publiſhed in French."

ALTERATION IN CHAPTER XXII.

(Numbered XXIII. in the new edition.)

P. 413, at the end of the chapter.

THE word "ambergreaſe" is omitted in the enumeration; and the Author adds, that he ſhall arrange it among the animal products.

CHAPTERS XXIII. XXIV. XXV. XXVI. and XXVIII. are not altered.

Chapter XXVII. upon ambergreaſe, is transferred to vol. iv. p. 415.

P. 443.

The ſupplement to the mineral kingdom is transferred to the end of the fourth volume, and compoſes part of the fifth volume in the new edition.

SUP-

SUPPLEMENT
TO THE
ELEMENTS
OF
NATURAL HISTORY
AND
CHEMISTRY.

ALTERATIONS AND ADDITIONS IN VOLUME IV.

CHAPTERS I. II. and III. ſtand as in the former edition.

CHAPTER IV.

P. 23.

The title of this chapter is enlarged, as follows:

"Of the eſſential ſalts of vegetables in general, and of thoſe which are analogous to mineral ſalts in particular."

P. 24, l. 8.

The ſix following lines, beginning with the words "the eſſential," and ending with "mineral ſalts," are eraſed, and the following ſubſtituted: "This proceſs cannot take place, except with regard to ſuch cryſtallizable eſſential ſalts as exiſt, ready formed, in vegetables. But vegetable ſalts have been diſcovered which are not cryſtallizable; ſome of which cannot be extracted but by more complicated proceſſes, becauſe of their mixture or combination with other principles. In order to know all the ſalts which vegetables contain or afford, we think it proper to diſtinguiſh them into ſix genera.

The firſt contains vegetable ſalts analogous to thoſe of the mineral kingdom.

The ſecond contains the pure acids of plants.

In the third, we ſhall place ſuch acid ſalts as are combined with a certain quantity of potaſh, and we ſhall diſtinguiſh them by the names of acidules.

The fourth genus will include thoſe which are formed by the action of the nitric acid upon certain vegetable matters.

The fifth will be compoſed of thoſe which owe their formation to heat.

And laſtly, the ſixth genus will be appropriated to ſuch acids as are developed by a particular fermentation.

The firſt genus of vegetable ſalts. Salts analogous to thoſe of the mineral kingdom.

The firſt genus of the eſſential ſalts of vegetables comprehends the neutral ſalts analogous to thoſe of the mineral kingdom, which are extracted from their juices. The principal ſpecies are," &c. as in line 14, p. 24.

P. 24, l. 7 (from the bottom)

After the word "tamariſk," inſert the words, "and rotten wood."

——l. 3 (from the bottom).

Add, "The exiſtence of this laſt ſalt is doubtful; for Scheele ſuſpects that Model miſtook the calcareous oxalate, or combination of the ſaccharine acid with lime, for ſelenite."

P. 26, l. 11.

Add, "Whatever might be the reſult of this experiment, it will be ſhewn, that ſeveral ſalts which we have examined in the mineral kingdom, ſuch as the vegetable alkali, the cretaceous or carbonic acid, and perhaps ſeveral others, are immediately formed in vegetables."

Here ends Chapter IV. in the new edition, and in this place is inſerted a new chapter, as follows :

CHAPTER V.

Of the Second Genus of Eſſential Salts, or the pure Acids of Vegetables.

" WE arrange, in the ſecond genus of vegetable eſſential ſalts, thoſe acids which are ready formed, and are extracted in a ſtate of purity, by very ſimple proceſſes. There are four acids of this kind, namely, the citric acid, or acid of lemons, the gallic acid, the malic acid, and the benzoic acid.

§ 1. *Of the Citric Acid.*

WE call by the name of the citric acid, that pure acid which Scheele obtained from the juice of lemons.

The chemiſts formerly, without attending to the peculiar characters preſented by this acid juice, compared it to that of tartar; and, at that time, all the vegetable acids appeared to be of the ſame nature. Attempts had been made to concentrate and purify the acid juice of lemons and of oranges, in order to preſerve them during long voyages. The juice of the former of theſe fruits has a taſte ſo ſtrongly acid, and it alters moſt blue colours ſo efficaciouſly, that its nature cannot be doubted. Mr. De Morveau has found that the ſpecific gravity of this juice is to diſtilled water as 1,060 to 1.

When this expreſſed juice is kept, it becomes turbid, aſſumes a diſagreeable taſte, and becomes covered with mouldineſs; this alteration depends on a very abundant mucilage it contains, which the chemiſts have endeavoured to deprive it of. Before other methods were contrived, it was preſerved in glaſs bottles, beneath a thin covering of oil. Some perſons have propoſed to put ſand in the veſſels, others added a mineral acid: theſe two laſt proceſſes manifeſtly altered its nature; the firſt method was preferable to them, though, even in that ſituation, the juice, at the end of ſome days, contracted a ſharp, oily, and diſagreeable taſte. Mr. Georgius has publiſhed, in the Acts of the Academy of Stockholm in 1774, a proceſs to concentrate the juice of lemons, and render it unalterable. He directs that the lemon-juice ſhould be kept for ſome time in a cellar in bottles laid down, in order to ſeparate part of the mucilage, and afterwards to expoſe it to a cold of three or four degrees below 0 on the thermometer of Reaumur: the aqueous part freezes, and takes with it, as it appears, a portion of the mucilaginous matter. Care muſt be taken to ſeparate the ice from the liquid, in proportion as it is formed: and the congelation muſt be continued until the ice which is formed becomes acid. Mr. Georgius has found, that when the juice is reduced to one-eighth of its volume, it is eight times ſtronger than before. A quantity of juice of lemon, which ſaturated thirty-ſix grains of potaſh in the ounce, ſaturated the ſame quantity of alkali, excepting one dram, after having been concentrated by froſt. This acid, thus concentrated, may be employed in all domeſtic uſes, or a dry lemonade may be made with it by mixing it with ſix parts of refined ſugar in powder.

Lemon-juice recently expreſſed, and expoſed for ſome hours to the air, at the temperature of above 15 degrees of Reaumur, depoſits a white, ſemi-tranſparent, mucilaginous matter, of a gelatinous conſiſtence: when this juice is decanted and filtered, it is much leſs alterable than before. The dried, mucilaginous ſubſtance does not diſſolve in boiling water; when treated with the acid of nitre, it affords azotic gas, and becomes converted into oxalic acid: it is not a gummy mucilage, but has an analogy with the vegetable gluten, of which we ſhall ſpeak at the article flour.

Mr. Dubuiſſon has preſerved lemon-juice by an oppoſite proceſs to that of Mr. Georgius. By evaporating this juice in a gentle heat long continued, the mucilage thickens, and is ſeparated in the form of a cruſt or ſcum, and glutinous flocks; the liquid acid is concentrated, and may be preſerved a long time without alteration, in bottles well cloſed. Mr. Dubuiſſon has obſerved, that the contact of the air which remains between the cork and the ſurface of this acid liquor concentrated by evaporation, is ſufficient to ſeparate, in the courſe of ſome weeks, flocks of a white ſubſtance, which he ſuppoſes to be glutinous, and which are collected together at the ſurface, where they form a coherent elaſtic body. The acid is not ſenſibly altered during this ſeparation.

Such are the various proceſſes which have been propoſed and uſed before the time of Scheele, to purify and preſerve lemon-juice. Although they prove that chemiſts had employed themſelves upon this acid, yet it was not made, except for the uſes of pharmacy; and the perſuaſion that its nature was analogous to that of the acid of tartar was ſuch, that it had never been called in queſtion. Stahl had aſſerted that lemon-juice, ſaturated with crabs eyes or chalk, aſſumed the nature of vinegar. Several chemiſts had attempted to combine it with alkalis, and had not been able to obtain permanent cryſtals from theſe combinations, doubtleſs on account of the mucilage with which it is ſo abundantly mixed. Mr. De Morveau aſſures us, nevertheleſs, that, after having ſaturated the carbonate of potaſh, or mild vegetable alkali, with lemon-juice, the ſolution, expoſed to the air, and filtered ſeveral times, afforded him a cryſtallized ſalt in ſmall opaque grains which were not deliqueſcent.

Scheele has given, in Crell's Chemical Journal for 1784, a proceſs for obtaining the acid of lemon in a ſtate of great purity, ſeparated from the mucilage and extractive matter, which alter this fruit in the expreſſed juice, and under a concrete form: alcohol, which he at firſt uſed to ſeparate the mucilage by coagulation, did not ſucceed; for after having filtered the thickened fluid, evaporation did not afford cryſtals. He availed himſelf of the proceſs he had diſcovered ſeveral years before, to purify the tartareous acid, and he ſucceeded, in obtaining the pure citric acid in a concrete ſtate. The following is the proceſs: Boiling lemon-juice was ſaturated with powdered chalk; the acid formed with the chalk a ſalt of difficult ſolubility, and the ſupernatant water retained in ſolution the mucilaginous and extractive ſubſtances; the precipitate was waſhed with warm water until the fluid came off colourleſs: it is nearly as ſoluble in water as the ſulphate of lime or ſelenite; it was afterwards treated with the quantity of ſulphuric acid neceſſary for the ſaturation of the doſe of chalk employed, and diluted with ten parts of water: this mixture was boiled for ſeveral minutes. After cooking, it was filtered; the ſulphate

of

of lime remained on the filtre, and the evaporated liquid afforded a concrete and cryſtallized acid. In this operation, it is better, according to the remark of Scheele, that there ſhould be an exceſs of ſulphuric acid, than to leave a ſmall quantity of lime, which prevents the citric acid from cryſtallizing: the exceſs of ſulphuric acid remains in the mother water.

The citric acid thus prepared is very pure and concentrated; its taſte is ſtrongly acid, and it reddens all the blue vegetable colours which are capable of that change. Fire decompoſes and converts it into an acidulous phlegm, gaſeous carbonic acid, and carbonated hydrogenous gas; a ſmall portion of charcoal remains in the retort: its cryſtals are not altered in the air; it is very ſoluble in water, and its ſolution is decompoſed by a true putrefaction, which is very ſlow. United with earths and alkalis, it forms the citrates of alumine, of barytes, of magneſia, of lime, of potaſh, of ſoda, and of ammoniac, whoſe properties have not yet been well aſcertained, but which are known to be different from all other neutral ſalts. The nitric acid does not convert it into oxalic acid, as it does ſeveral other vegetable acids; it ſeems to be one of the moſt powerful of theſe acids; it acts on ſeveral metallic ſubſtances by the aſſiſtance of water, and notably on zinc, iron, copper, &c.

Its affinities, pointed out by Bergman, are in the following order: Lime, barytes, magneſia, potaſh, ſoda, ammoniac. Mr. Breſſey, of Dijon, has determined its attractions ſomewhat differently: according to him, barytes holds the firſt rank, lime the ſecond, and magneſia the third; the alkalis come afterwards. It follows, from the reſearches of theſe two obſervers, that the three alkaline earths are preferred to alkalis by this acid.

The uſes of the citric acid are ſufficiently numerous. With water and ſugar it forms a very agreeable drink, known under the name of lemonade. It is employed in medicine as refreſhing, cooling, antiſeptic, antiſcorbutic, diuretic; more particularly it corrects acrid bile. It is ſometimes uſed as a ſlight eſcharotic in ſcorbutic ulcers, dartrous eruptions, and ſpots on the ſkin. When concentrated by the proceſs of Mr. Georgius, or Mr. Dubuiſſon, it may be uſed in ſea voyages, and will be a great reſource in remote expeditions of this kind.

§ 2. *Of the Gallic Acid.*

WE give the name of gallic acid to that which is extracted from the nut-gall, which grows on the oak by the puncture of an inſect. This acid exiſts in general in greater or leſs quantities, in all vegetable, auſtere, or aſtringent ſubſtances: ſuch are the woods of the oak, the aſh, the willow, the barks of the ſame trees, the quinquina, ſimarouba, pomegranate, ſumach, tormentilla; the nuts of cypreſs; the huſks of nuts; the ſtem and leaves of the marſh iris, the ſtrawberry plant, the nenuphar, &c.

Chemiſts were formerly acquainted, in this ſubſtance (which they diſtinguiſhed by the name of aſtringent principle), with no other property than that of precipitating the ſolutions of iron in acids of a black colour, or of forming ink, which, indeed, is an excluſive and very characteriſtic property. Meſſrs. Macquer, Monnet, Lewis, Cartheuſer, and Gioanetti, made experimental inquiries into the mode of action of this principle upon iron. Mr. Monnet had more particularly remarked, that the nut-gall and aſtringent vegetable juices acted immediately on iron, and gave it a black colour. Mr. Gioanetti had obſerved, that the precipitate, or atramentary fecula, was not attracted by the magnet, and that the iron was not in the metallic ſtate, as had been ſuppoſed before his time. Theſe obſervations ought to have led to the notion that the aſtringent principle of the nut-gall was an acid, or at leaſt that it acted as an acid in chemical operations. The academicians of Dijon are, however, the firſt who, after the above-mentioned authors, began to perceive in their experiments that the aſtringent principle was an acid. Theſe learned men have ſhewn,

1. That the product of the nut-gall by diſtillation blackened the ſolution of ſulphate of iron or martial vitriol. 2. That one ounce of this excreſcence affords a tincture to cold water, from which 3 $\frac{1}{2}$ drams of extract are obtained by evaporation. 3. That this infuſion reddens turnſole and blue paper. 4. That the ſame principle is ſoluble in oils, in alcohol, and in æther. 5. That the acids diſſolve it without altering it, and without depriving it of the property of precipitating iron of a black colour. 6. That this ſolution in water precipitates alkaline ſulphures. 7. That it completely decompoſes all metallic ſolutions, and colours their calces at the ſame time that it combines with them. 8. Laſtly, that it diſſolves iron in the direct way, and reduces ſilver and gold, after having ſeparated them from their ſolvents. Such are the important facts announced by the academicians of Dijon, ſeveral of which were, indeed, before perceived by ſome chemiſts, but were not conſidered by any of them as indications of the acidity of this principle, excepting by theſe philoſophers.

Since their time, Scheele has not only ſhewn that all auſtere and aſtringent plants exhibit ſigns of acidity, but he has likewiſe diſcovered and deſcribed a proceſs to obtain this vegetable, pure and cryſtallized.

Six pounds of diſtilled water are poured upon one pound of nut-galls in powder; this is left to macerate during fifteen days, at the temperature of between 16 and 20 degrees of Reaumur; it is then filtrated, and the fluid is left in a tureen of ſtone ware, or a large glaſs capſule. It is ſuffered to evaporate ſlowly by expoſure to the air. A mouldineſs and thick pellicle is formed, which appears as if glutinous; very abundant mucilaginous flocks fall down; the ſolution then no longer poſſeſſes a very aſtringent taſte, but is very ſenſibly acid; and after two or three months expoſure to the air, a brown cruſt is obſerved adhering to the ſides of the veſſels, and covered with granulated, brilliant, yellowiſh, grey cryſtals; the ſame cryſtals likewiſe exiſt in large quantities beneath the thick pellicle which covers the liquor; the fluid is then decanted, and alcohol is poured on the depoſit of pellicle and of cryſtalline cruſt, and heated. This ſolvent takes up the whole of the cryſtallized ſalt, but does not touch the mucilage. By evaporation of this ſpirituous ſolution, the pure gallic acid is obtained in ſmall granulated cryſtals, of a brilliant appearance, and ſlightly yellowiſh grey colour.

The gallic acid, thus purified, has a ſour and ſlightly aſtringent taſte: it precipitates martial vitriol, and all other ſalts of iron, in a very beautiful and bright black; it ſtrongly reddens the tincture of turnſole; heated with the contact of air, it ſwells up and takes fire, emitting a ſomewhat agreeable ſmell, and leaves a charcoal of difficult incineration. When diſtilled by a gentle heat, part riſes, diſſolved in the water of cryſtallization; another part riſes in ſmall ſilky cryſtals, without decompoſition; a ſtrong fire ſeparates ſome drops of oil, carbonic acid gas or fixed air, and carbonated hydrogene, or inflammable air contaminated with fixed air. The nut-gall, diſtilled in ſubſtance, affords a ſmall quantity of concrete ſalt, analogous to the ſublimed gallic acid.

The gallic acid requires 24 parts of cold water, but no more than three of boiling water to diſſolve it: repeated ſolutions and cryſtallizations do not render it ſenſibly whiter. Alcohol diſſolves it much more effectually; four parts of this liquid are ſufficient when cold, but when boiling it is ſoluble in an equal weight of that fluid.

This acid diſengages the carbonic acid from earthy and alkaline baſes, when its action is aſſiſted by heat.

With barytes, magneſia, and lime, it forms ſalts, ſoluble in water, more eſpecially by the aſſiſtance of an exceſs of theſe baſes. Vegetable alkali, ſoda, and volatile alkali, unite very readily with it, and form ſalts, whoſe properties are not yet known.

The nitric acid converts the gallic acid into the oxalic acid, or acid of ſugar.

The gallic acid precipitates gold from its ſolvent in the form of a brown powder, and part of the metal appears at the ſurface in a brilliant and metallic pellicle. Silver is precipitated of a brown colour, and a film of this metal reduced, ſoon covers the ſurface of the liquor. Mercury is precipitated of an orange yellow; copper of a brown colour; iron of a beautiful bright black; and biſmuth of a yellow lemon colour. The ſolutions of platina, zinc, tin, cobalt, and manganeſe, are not altered by this acid.

Such are the properties diſcovered by Scheele in the gallic acid, prepared as has been deſcribed above: they are ſufficient to cauſe this ſalt to be conſidered as a peculiar acid, different from all others. Its intimate nature, and the proportion of its principles, have not yet been determined. Mr. De Morveau has obtained from it a reſin, which he ſuppoſes to be the acidifiable baſe, whoſe union with oxigene forms this acid.

The uſes of the nut-gall for dying black are ſufficiently known. We ſhall only add, to what we have already ſaid at the article of iron, that, by employing the purified gallic acid for the preparation of ink, this fluid is very beautiful, very black, and may be kept a long time without alteration.

§ 3. *Of the Malic Acid.*

WE give the name of malic acid to a peculiar vegetable acid which Scheele extracted from the juice of ſeveral fruits, and which he found more particularly abundant in apples.

To obtain this acid, the juice of four apples is expreſſed, and ſaturated with vegetable alkali; to this liquor a ſolution of acetite of lead or ſugar of ſaturn is added; a double decompoſition takes place, the acetous acid combines with the alkali, and the malic acid with the calx of lead; the metallic ſalt or malate of lead falls down: this precipitate is waſhed and treated with the vitriolic acid, diluted with water; ſulphate of lead is formed, and the malic acid remains in the liquor. It is neceſſary to add a ſufficient quantity of ſulphuric acid to decompoſe the whole of the malate of lead, which is known by the freſh acid taſte of the liquor.

This acid poſſeſſes the following properties: It cannot be obtained in the concrete form. With the three alkalis, it forms deliqueſcent neutral ſalts. With lime it forms a ſalt which affords ſmall irregular cryſtals, ſoluble in boiling water, in vinegar, and in the malic acid itſelf. With clay it forms a ſalt of very difficult ſolubility. With magneſia, a deliqueſcent ſalt. It diſſolves iron; and this ſolution is brown, and does not afford cryſtals. With zinc, which it diſſolves well, it affords a ſalt in very fine cryſtals. The nitric acid changes it into the oxalic acid, or acid of ſugar. It precipitates the nitrates of mercury, of lead, of ſilver, or of gold, in the metallic ſtate. The calcareous malate decompoſes the ammoniacal citrate, or combination of the volatile alkali with the acid of lemons, and calcareous citrate is formed, which is inſoluble in boiling water and in the vegetable acids. The ſolution of calcareous malate in water is precipitated by alcohol. Laſtly, the malic acid is readily deſtroyed by fire, which changes it into the carbonic acid or fixed air: this laſt partly ſaturates the baſes of the malates, which are decompoſed by heat. Theſe are the properties which eſtabliſh the peculiar characters of this acid.

Scheele found it almoſt pure, or mixed with a ſmall quantity of citric acid, or acid of lemons, in the juice of apples, barberries, elderberries, ſloes, the fruit of the ſervice-tree, and damſons.

He found it in combination with half its weight of acid of lemons in gooſeberries, cherries, ſtrawberries, raſpberries, and blackberries.

And, laſtly, he obtained it from ſugar by the nitric acid; and Mr. De Morveau remarks, that the malic acid appears before the oxalic acid, or acid of ſugar.

When four fruits contain, at the ſame time, the citric acid and the malic acid, the following is the proceſs which Scheele has followed to ſeparate them, and obtain the latter in a ſtate of purity. The juice of gooſeberries, ſaturated with chalk, affords calcareous citrate, which falls down becauſe inſoluble; the ſupernatant liquor holds in ſolution the calcareous malate, which is ſeparated by alcohol: but as it ſtill remains in combination with a portion of mucilage, Scheele had recourſe to another method to obtain it pure. He evaporated the juice of gooſeberries to the conſiſtence of ſyrup, upon which he poured alcohol, which diſſolved the acid without touching the mucilage, and he ſeparated the latter by the filtre; the liquor being filtrated, he evaporated the alcohol, and ſaturated the acids with chalk: the portion of citric acid was precipitated in the form of calcareous citrate, and the calcareous malate remained diſſolved. This new alcohol precipitated it from its ſolvent, and Scheele obtained the malic acid by diſſolving this ſalt in water, precipitating this ſolution by the acetite or acetous ſalt of lead, and by decompoſing the malate of lead by the ſulphuric acid. The malic acid was diſengaged in the ſupernatant liquor.

§ 4. *Of the Benzoic Acid.*

IT has been known, ſince the time of Blaiſe de Vigenere, who wrote at the commencement of the laſt century, that benjamin affords, by diſtillation, an acid ſalt, cryſtallized in very fragrant needles, of an acrid taſte, which in pharmacy are diſtinguiſhed by the name of flowers of benjamin. Chemiſts formerly ſuppoſed it to be a mineral acid modified; but at preſent, the particular and characteriſtic properties which have been diſtinguiſhed in it do not permit us to doubt but that it is a vegetable acid, different from all other acids.

This acid exiſts in benjamin, balſam of Peru and of Tolu, ſtorax, liquid amber, and the vanilla, around which it cryſtallizes: Scheele likewiſe found it in ſugar of milk, and extract of urine. It will be ſeen, at the article Benzoin, that the ſimple proceſs formerly employed in obtaining it, conſiſted in ſublimation by a gentle fire. Geoffroy diſcovered, in 1738, that it might be extracted by water, and that this ſubſtance was contained ready formed in the benzoin. I have extracted it, by the ſame proceſs, from balſam of Peru, ſtorax, and the huſks of vanilla; but this method affords only a ſmall quantity, becauſe the reſin of benzoin, which does not mix with water, envelopes and defends a great part of the acid ſalt.

In the year 1776, Scheele publiſhed, in the Memoirs of Stockholm, important obſervations upon the benzoic acid. 96 parts of benzoin afforded, by ſublimation, between 9 and 10 parts of this ſublimed ſalt, which is very far from the eſtimation of Spielman, who affirmed, that he obtained $\frac{1}{4}$ of the weight of the benzoin made uſe of. It appears, that the chemiſt of Straſburg eſtimated it when mixed with much empyreumatic oil. Scheele boiled water upon benzoin in powder, mixed with chalk, and filtered the liquor, which afforded no ſalt by cooling. The ſulphuric acid being poured upon this liquor, ſeparated the benzoic acid in powder, and ſhewed that this acid had united to the baſe of the chalk, and had formed a neutral ſalt, ſoluble in water; nevertheleſs, the quantity of concrete acid, precipitated by this proceſs, was not more conſiderable than that which is obtained by ſimple lixiviation. Scheele ſuppoſed that he ſhould obtain more by employing a ſubſtance capable of acting upon the reſin, and facilitating the ſeparation of the ſalt: the vegetable alkali did not anſwer this purpoſe; the reſin united at the ſurface of the fluid in the form of a denſe and tenacious oil, which afforded no hopes of a ſufficiently complete ſeparation of the acid. Quick-lime ſucceeded better, and the following proceſs invented by him is uſed: 4 ounces of quick-lime are extinguiſhed in 12 ounces of water, and 8 pounds of water are added when the ebullition has ceaſed; 6 ounces of this lime-water are poured over 1 pound of benzoin in powder, with ſufficient agitation to mix theſe two ſubſtances; the whole of the lime-water is added by degrees. This mixture by parts prevents the benzoin from uniting into a maſs. The liquor is heated over a gentle fire for half an hour, with continual agitation; it is then taken from the fire, and ſuffered to ſettle for ſeveral hours; the clear liquor is then decanted, and 8 pounds of water thrown on the reſidue, which, after being boiled for half an hour, is ſuffered to ſubſide, and when clear is added to the preceding fluid. This waſhing and ebullition is repeated twice more, and the waſhing is ended by pouring hot water through the reſidue upon a filtre: all theſe waters are afterwards reduced to two pounds by evaporation: a ſmall quantity of reſin ſeparates; the evaporated liquor being cooled, muriatic acid is added drop by drop, until no more precipitate falls down, and the liquid exhibits a taſte ſenſibly acid; the ſalt of benzoin is the precipitate in the form of a powder; it is edulcorated on the filtre. If cryſtals be deſired, it may be diſſolved in 5 or 6 times its weight of boiling water, which being filtered through a cloth, and ſuffered to cool ſlowly, the ſalt is depoſited in flat and very long priſms.

In this proceſs, the lime abſorbs the benzoic acid, and forms with it calcareous benzoate, which is very ſoluble: the reſin ſeparates from this ſalt, which has but a ſmall affinity with it; the muriatic acid, whoſe attraction for lime is ſtronger than that of the benzoic acid, ſeizes the earth, and ſeparates the vegetable acid. The liquor reduced to two pounds by evaporation, is not ſufficient to hold the acid in ſolution, and almoſt the whole is depoſited. The calcareous benzoate has not the ſmell of benzoin; but as ſoon as

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the benzoic acid is ſeparated by the muriatic acid, it reſumes the lively ſmell which is peculiar to that balſamic ſubſtance. By this proceſs Scheele obtained 12 or 14 drams of benzoic acid from one pound of benzoin; whereas ſublimation affords no more than 9 or 10. He informs us, likewiſe, that the purification of this ſalt by hot water and by cryſtallization, cauſes the loſs of a great quantity, and that this purification is not neceſſary for pharmaceutic uſes. In fact, this ſalt, well cryſtallized, is very difficult to reduce to powder, and the purification has no other object than to ſeparate about two grains of reſin in the pound of benzoin. Laſtly, he remarks that the filtration of this acid diſſolved in water cannot be made but through a cloth, as it ſeparates quickly, and in proportion as the liquor cools, the ſalt cloſes the pores of the paper, and the filtration cannot proceed.

Since theſe experiments were made by Scheele, Mr. Lichtenſtein has publiſhed, in Germany, Obſervations on the Benzoic Acid, in which he aſſures us that ſublimation affords more of this acid than the proceſs with lime-water; but I think, with Scheele and Mr. De Morveau, that this cannot be underſtood but of the purified ſalt.

The pure benzoic acid has a ſlightly ſour, penetrating, hot, and acrid taſte; its ſmell is but ſlightly aromatic, and it reddens the colour of turnſole very well.

Heat volatilizes it, and at the ſame time ſingularly increaſes its odour. If it be expoſed to the action of the blow-pipe in a ſilver ſpoon, it liquefies, according to the obſervation of Mr. Lichtenſtein, and evaporates without enflaming. If it be ſuffered to cool, it forms a ſolid cruſt, whoſe ſurface preſents traces of cryſtallization in divergent rays: it does not burn with flame, unleſs it be in contact with bodies which are themſelves ſtrongly inflamed; the contact of a burning coal only cauſes it to ſublime rapidly.

Air does not appear to have any action upon this acid; for, after having been preſerved 20 years in a glaſs veſſel, it was very pure, and had loſt nothing of its weight; its ſmell is diſſipated, but it recovers it again by heat.

The benzoic acid is but ſparingly ſoluble in cold water: from the experiments of Meſſrs. Wenzel and Lichtenſtein, it appears that 480 grains of cold water diſſolve no more than one grain, and that the ſame quantity of boiling water can diſſolve 20 grains, of which 19 ſeparate by cooling. Bergman affirms that boiling water can take up $\frac{1}{24}$ of its weight, and that at the mean temperature it diſſolves ſcarcely $\frac{1}{500}$.

The benzoic acid unites to all the earthy and alkaline baſes, and forms with them the benzoates of alumine, of barytes, of magneſia,

neſia, of lime, of potaſh, of ſoda, and of ammoniac; the characteriſtic properties of theſe ſeveral combinations are not known, nor the various attractions of this acid for the baſes. Mr. Lichtenſtein affirms that it prefers the fixed alkalis, and even ammoniac, to the aluminous, magneſian and calcareous earths: but more numerous experiments are required to determine exactly the order of theſe attractions, more eſpecially as Bergman arranges them differently: according to him, lime ſeparates the alkaline baſes, and barytes ſeparates lime: it diſengages the carbonic acid from all theſe baſes.

The concentrated ſulphuric acid readily diſſolves it without heat, and without noiſe, according to the ſame chemiſt; nevertheleſs it paſſes to the ſtate of ſulphureous acid. The benzoic acid may be ſeparated without alteration by water.

The nitric acid diſſolves it in the ſame manner, and water equally diſengages this ſalt unaltered. Mr. De Morveau has augmented the action of theſe two bodies by heat, and the nitrous gas was not diſengaged but towards the end; and the benzoic acid was ſublimed entire and without alteration. However, Mr. Hermſtadt affirms that by employing the concentrated nitrous acid, the benzoic acid becomes fluid, more fixed, and aſſumes the characters of the tartareous or oxalic acid; but this reſult, which is itſelf very uncertain, requires additional reſearches. That which appears to be the moſt certain reſpecting this acid is, that it differs by its nature and properties from all the other vegetable acids, and that it retains an eſſential oil, which gives it ſmell, volatility, combuſtibility, and ſolubility in alcohol."

ALTERATIONS AND ADDITIONS IN CHAPTER VI.

THIS chapter is partly new and partly tranſpoſed: it immediately follows the preceding chapter, and is entitled,

"Concerning the vegetable acids, which are partly ſaturated with potaſh; and concerning the ſame acids in a ſtate of purity."

After which, the body of the chapter proceeds as follows:

"In the fourth chapter we have diſtinguiſhed a peculiar ſpecies of vegetable acids, which we have obſerved are partly combined with potaſh, or the vegetable alkali. We are acquainted with two acids in this ſituation, namely, the acid of tartar, and that of ſorrel. We diſtinguiſh theſe partly neutralized acids by the names of acidules; the one tartareous, and the other pure.

§ 1. Concerning the tartareous acidule or tartar, and the pure tartareous acid."

In this place the matter of Chapter XXII. page 178, of the preſent volume, is inſerted, with the alterations which we ſhall proceed to note.

P. 179, l. 5.

Add, " Many other chemiſts have ſince found it ready formed in ſeveral fruits."

P. 182, at the bottom.

Add, " It appears that this formation of ammoniac, or volatile alkali, is owing to the azote of the potaſh, which unites to the diſengaged hydrogene of the oil."

P. 183, l. 10.

Add, " If it be left expoſed to the air, it becomes turbid, and after ſome time depoſits mucilaginous flocks. The acid is decompoſed, and the fluid is found to contain nothing but carbonate of potaſh, or mild vegetable alkali. Mr. Demachy firſt obſerved this decompoſition. Meſſrs. Spielman and Gorvinus have likewiſe buſied themſelves on this ſubject; but Mr. Berthollett has made experiments which are ſtill more accurate than thoſe which preceded him. He has obſerved, that 2 ounces of the tartareous acidule required 18 months for their entire decompoſition; that it afforded 6 $\frac{1}{2}$ drams of carbonate of potaſh, ſtill oily, and mixed with a ſmall quantity of carbone; that this quantity of alkali anſwered with ſufficient exactneſs to that which was afforded by the acidule, by combuſtion, and calcination. The alkaline reſidue of the diſtillation, and this ſpontaneous decompoſition, prove, therefore,

fore, that the tartareous acidule contains nearly $\frac{1}{4}$ of its weight of potaſh."

P. 183, l. 10 (from the bottom).

Add, " Theſe phenomena depend on the ſtate of the tartareous acid, which is partly ſaturated in this vegetable acidulous ſalt."

P. 184, l. 17.

The remainder of this paragraph, from the word " Bergman," to the word " vegetables," upon page 185, is omitted.

P. 186, l. 12.

Inſert, " This ſolution is decompoſed during the courſe of ſome months, and leaves the tartareous acidule combined with the carbonic acid."

P. 188, l. 2.

Add, " When it is prepared, it ſeems that the portion of tartrite of potaſh, whoſe union with the tartareous acid conſtitutes the acidule or cream of tartar, remains in the mother water."

P. 193, l. 14.

Add, " It appears that the tartrite of antimony or antimoniated tartar, contains the portion of tartrite of potaſh, which forms part of the tartareous acidule, and that it is a kind of triple ſalt."

After page 196, the Author proceeds to add the following new matter in the preſent chapter, concerning the tartareous acid.

"Such are the properties of the native tartareous acidule, or of the tartareous acid combined by nature with a certain quantity of potaſh: it was neceſſary to examine it with care, becauſe this ſubſtance is very uſeful, and much employed in this ſtate. But this is not the pure tartareous acid, whoſe properties and characters are of equal importance to be known. Mr. Retzius has publiſhed, in the Memoirs of Stockholm for 1770, a proceſs, invented by Scheele, for the extraction and purification of this acid. Waſhed chalk is thrown into a ſolution of 2 pounds of cream of tartar in boiling water, until there is no longer any efferveſcence nor acid at liberty; ſomewhat more than $\frac{1}{4}$ of the weight of the cream of tartar is required: the precipitate of calcareous ſalt which is formed muſt be then collected on the filtre, and waſhed with warm water; it commonly amounts to 32 or 33 ounces, on account of the water it retains. The liquor decanted from this precipitate affords, by evaporation, nearly the half of the weight of the cream of tartar, which has not been decompoſed: 9 $\frac{1}{2}$ ounces of denſe vitriolic acid, diluted with 5 pounds 5 ounces of water, is poured on the calcareous ſalt of tartar, and the mixture is left to digeſt for 12 hours, being agitated from time to time. The liquor is then decanted from the ſelenite or vitriolic ſalt of lime; and the water is evaporated after having aſcertained that it does not contain ſulphuric acid. For this purpoſe, a few drops of acetite of lead, or ſugar of lead, are added; if the precipitate which is formed be entirely ſoluble in vinegar, the lixivium does not contain ſulphuric acid; if it is not ſoluble in this fermented acid, it contains the vitriolic acid, of which it may be cleared by digeſting the liquor on a certain quantity of calcareous tartrite. Lime may be uſed inſtead of chalk, to obtain the tartareous acid; but as this alkaline earth decompoſes the tartrite of potaſh contained in the tartareous acidule, the lixivium contains only alkali inſtead of the tartrite of potaſh, as in the former proceſs. The uſe of quick-lime in this decompoſition affords a great quantity of acid, becauſe this earth decompoſes twice its weight of tartareous acidule or cream of tartar.

The pure tartareous acid obtained in the liquid ſtate by either of the above-deſcribed proceſſes, muſt be evaporated to dryneſs; afterwards re-diſſolved and cryſtallized, either by gentle evaporation, according to Mr. Pœcken, or by cooling the liquor evaporated to the conſiſtence of clear ſprup, according to Bergman. It is obtained in the form of ſmall needles acutely pointed, or fine priſms, whoſe form is difficult to be determined.

Bergman deſcribes them as ſmall diverging leaves; Mr. Retzius compares them to hairs intertwined together. They are at firſt very white, but thoſe which are obtained towards the end are yellow.

The cryſtallized tartareous acid melts, fumes, blackens, and even takes fire by the contact of ignited bodies. By diſtillation it affords, like the tartareous acidule itſelf, an acid phlegm, a ſmall quantity of oil, and much gaſeous, carbonic acid, mixed with carbonated hydrogenous gas. The charcoal which remains, contains neither acid nor alkali; which proves that this laſt is not formed by the decompoſition of the tartareous acid by fire. This acid, though purified, is always oily. It is for this reaſon that we diſtinguiſh it, in the new nomenclature, by the name of tartareous acid, and its ſalts by that of tartrites.

It is unalterable in the air, is much more ſoluble than cream of tartar; its taſte is very penetrating; it reddens the tincture of violets, and likewiſe that of turnſole; it perfectly diſſolves alumine or clay, and forms with it an aluminous tartrite, which aſſumes a gummy or mucilaginous appearance by evaporation.

In combination with magneſia, the pure tartareous acid likewiſe forms a kind of gelatinous matter inſtead of cryſtallizing.

With lime it forms a ſalt which is ſcarcely ſoluble.

If a ſmall quantity of vegetable alkali be poured into its ſolution, cryſtals of the tartareous acidule, or cream of tartar, fall down. This diſcovery of Scheele and Bergman throws the greateſt light on the nature of this vegetable ſalt: there no longer remain, as Macquer obſerved, any inquiries to be made concerning the compoſition of cream of tartar; it is known to be the tartrite of potaſh with exceſs of acid. But what is moſt ſingular is, that this acid, which is very ſoluble, immediately loſes this property when it is about half ſaturated by the alkali, which is, nevertheleſs, itſelf very ſoluble. This fine experiment likewiſe proves that the tartareous acid is not at all altered by the proceſs of Scheele, ſince it forms, with about $\frac{1}{4}$ or $\frac{1}{3}$ of its weight of potaſh, an acidulous ſalt, which is perfectly ſimilar to that formed by nature. If the proportion of potaſh be increaſed, a neutral ſalt is formed, which is perfectly ſaturated and ſoluble: it is the tartrite of potaſh or vegetable ſalt.

The tartareous acid united to ſoda conſtitutes a neutral cryſtallizable ſalt, or tartrite of ſoda very pure. With ammoniac it likewiſe affords an ammoniacal tartrite, which is cryſtallizable. Mr. Retzius affirms, that if the tartareous acid be combined with a quantity of ammoniac, much leſs than is neceſſary to ſaturate it, an ammoniacal tartareous acidule is formed, which is of ſparing ſolubility, and cryſtallizes like the tartareous acidule of potaſh, or common cream of tartar.

Though the tartareous acid has leſs affinity with alkalis than the mineral acids, yet theſe, by decompoſing the tartrites of potaſh and of ſoda, do not completely ſeparate their baſes, but diſengage the tartareous acid in the ſtate of acidule of potaſh or of ſoda. The diſengaged tartareous acid itſelf decompoſes in part the ſulphate, nitrate, and muriate of potaſh or Glauber ſalt, common nitre, and ſalt of Sylvius; and ſeparates the portion of alkali which is required to convert it into the ſtate of tartareous acidule or cream of tartar. It does not produce the ſame effect upon the nitrate and muriate of ſoda.

Mr. Hermſtadt affirms, that the tartareous acid becomes the oxalic acid by means of the nitrous acid. Bergman could not produce this change: but his want of ſucceſs was probably owing to his not having employed a ſufficient quantity of nitrous acid. As nitrous gas is afforded during this converſion, it appears that the oxalic acid differs from the tartareous acid only in containing a greater quantity of oxigene.

The tartareous acid has no action upon platina, gold, and ſilver; it diſſolves their oxides or calces; it acts only inſenſibly upon copper, lead, and tin; it diſſolves their oxides, and deprives that of lead of its red colour.

It diſſolves iron with a very violent efferveſcence.

It produces no alteration whatever in antimony in the metallic ſtate, but it diſſolves the vitreous calces of that ſemi-metal very well.

It takes lime from the nitric, muriatic, acetous, formic, and phoſphoric acids.

It precipitates the nitric ſolutions of mercury, the muriatic ſolutions of lead, &c.

Its attractions, pointed out by Bergman, are in the following order: Lime, barytes, magneſia, potaſh, ſoda, ammoniac or volatile alkali, alumine or argillaceous earth, the calces of zinc, iron, mangancſe, cobalt, nickel, lead, tin, copper, biſmuth, antimony, arſenic, ſilver, mercury, gold, platina; water and alcohol.

§ 2. Salt of ſorrel of commerce, or the oxalic acidule, is obtained in great quantities in Switzerland, in the Hartz, in Thuringia, and Swabia, from the juice of ſorrel, called oxalis acetoſella. One hundred pounds of this plant afford, according to Mr. Savary, fifty pounds of juice by expreſſion; and this affords only five ounces of concrete ſalt, by evaporation and cryſtallization. In commerce, the ſalt of ſorrel of Switzerland, which is the fineſt and whiteſt, is diſtinguiſhed from that of the foreſts of Thuringia, which is foul and yellowiſh.

It has long been known that the juice of ſorrel affords a neutral ſalt by evaporation. Duclos mentions it in the Memoirs of the

Academy for 1668. Junker likewiſe ſpeaks of it. Boerhaave has deſcribed, with much care, the proceſs proper for obtaining this ſalt, which he compares to tartar. Margraaf diſcovered the preſence of potaſh in the oxalic acidule, as well as in that of tartar. But the accurate knowledge of the nature of this ſalt has been acquired in conſequence of the labours of Meſſrs. Savary, Wenzel, Wiegleb, Scheele, and Bergman.

The oxalic acidule has the form of ſmall white, opaque, needle-formed, or lamellar cryſtals. Their exact form has not yet been determined, though Capeller and Ledermuller have repreſented it as ſeen in the microſcope. Mr. de Liſle defines them as very long parallelopipedons. Theſe are aſſemblages or groups of thin and long plates joined at one end and ſeparated at the other.

Its taſte is eager, penetrating, and at the ſame time rough or auſtere. It ſtrongly reddens the tincture of turnſole and blue paper; 480 grains of this acidule diſtilled in a retort by a well-regulated fire, by Mr. Wiegleb, afforded 150 grains of very acid phlegm, without ſmell or colour. There remained 160 grains of a grey ſalt, from which 156 grains of vegetable alkali were obtained. About four grains of concrete acid ſalt likewiſe ſublimed to the neck of the retort, but there did not paſs one ſingle drop of oil.

The loſs in this diſtillation was 166 grains;

but as Mr. Wiegleb does not mention the elaſtic fluids which muſt have been diſengaged in this analyſis, it is probable that the loſs is owing to the water in vapours, and carbonic acid gas, mixed with a ſmall quantity of hydrogenous gas and carbone. From this analyſis, compared with that of the tartareous acid, we ſee that the oxalic acidule is not ſo oily as this laſt; and accordingly it is found, that the liquid acid obtained in this diſtillation, is the pure oxalic acid; whereas the tartareous acidule, treated by the fire, affords an acid which is altered and is different from the tartareous acid itſelf. We diſtinguiſh it by the name of the pyro-tartareous acid. It is on account of this ſmaller quantity of oil, contained in the acid of ſorrel, that we have diſtinguiſhed it by the names of oxal*ic* acidule and acid; whereas the more oily acid of tartar has been named, according to the rules of the methodical nomenclature, tartar*eous* acid.

The oxalic acidule, expoſed to the air, ſuffers no change when it is pure: it is more ſoluble than the tartareous acidule. According to Mr. Wiegleb, one dram of the oxalic acidule of Switzerland requires no more than ſix drams of boiling water, but it is precipitated entirely by cooling, notwithſtanding the addition of ſix drams of cold water. According to Mr. Wenzel it is much more ſoluble; for, by his experiments, 960 parts of boiling water take up 675 of this ſalt; but its ſolubility appears to vary according to its greater or leſs ſtate of acidity, which no doubt depends on the plant from which it is extracted.

The oxalic acidule unites to barytes, magneſia, ſoda, ammoniac, and forms with them triple ſalts. Lime decompoſes it, by ſeizing its whole acid, as well that which is at liberty, as that which is combined with potaſh: 100 grains of chalk decompoſe 137 grains of the oxalic acidule. The precipitate of calcareous oxalate which is depoſited weighs 175 grains; the ſupernatant liquor affords 32 grains of carbonate of potaſh by evaporation. This proceſs cannot be uſed to prepare the pure oxalic acid in the ſame manner as the tartareous acid is obtained in a ſtate of purity, becauſe the calcareous oxalate cannot be decompoſed by the ſulphuric acid, as the calcareous tartrite is: on the contrary, the attraction of the oxalic acid for lime is ſo ſtrong, that it takes it from all other acids; and a ſure means of aſcertaining the purity of the oxalic acidule, or ſalt of ſorrel of commerce, conſiſts in pouring its ſolution into water, charged with a ſolution of calcareous ſulphate or ſelenite. If this acidule be truly extracted from ſorrel, an abundant precipitate is afforded.

The ſulphuric acid facilitates the diſengagement of the oxalic acid from this acidule by means of heat, according to Mr. Wiegleb. The nitric acid decompoſes the acidule, and ſeparates the alkali with much greater difficulty from this than from the tartareous acidule, according to the reſearches of Margraaf.

The oxalic acidule attacks iron, zinc, tin, antimony, and lead; it diſſolves the oxides of all the other metals, and forms with them triple ſalts, which are cryſtallizable and not deliqueſcent, in which the potaſh or vegetable alkali remains conſtantly united to the acid: it precipitates the nitric ſolutions of mercury and of ſilver. Mr. Bayen, by evaporating the liquor which flows above theſe precipitates, obtained common nitre, and confirmed the preſence of alkali in this acidule.

To prepare the oxalic acid, and deprive it of the portion of potaſh which renders it acidulous, we may, as has already been ſhewn, avail ourſelves of diſtillation; but this proceſs affords only a ſmall quantity; and that of Scheele, which is much more certain and eaſy, is preferable. The oxalic acidule, or ſalt of ſorrel, is ſaturated with volatile alkali. Into the ſolution of this triple ſalt, compoſed of the acid with the volatile and vegetable alkalis, the nitrous ſalt of barytes or ponderous earth is poured. A precipitate is formed of oxalate of barytes, and the nitric acid retains the alkalis. The barytic ſalt, when well waſhed, is decompoſed by the addition of vitriolic acid, which combines with the ponderous earth, and remains inſoluble at the bottom. The fluid being decanted, is to be eſſayed by the addition of a ſmall quantity of barytic oxalate, diſſolved in boiling water, to ſeparate the portion of vitriolic acid which may be contained in it; and when no more precipitate is afforded, the liquid, which contains the pure oxalic acid, may be decanted. This being duly evaporated, affords, by cooling, the cryſtallized acid in quadrilateral priſms, whoſe faces are alternately broad and narrow, and are terminated by dihedral ſummits. Theſe cryſtals often have the form of ſquare or rhomboidal plates.

This concrete acid has a very penetrating ſour taſte; it reddens all blue colours: one grain of the ſalt gives to 3600 grains of water, the property of reddening paper tinged with turnſole.

The concrete oxalic acid, expoſed to a mild heat, becomes dry, and covered with a white cruſt; ſoon afterwards it is reduced to powder, with the loſs of three tenths of its weight. By diſtillation in a retort with a ſtronger heat, though ſtill moderate, it liquefies, becomes brown, boils up, affords an acidulous phlegm, ſublimes in part without alteration, at the ſame time that a mixed gas, conſiſting of carbonic acid and inflammable or hydrogenous gas, is diſengaged.

If a very ſtrong heat be applied, more gas, leſs of concrete ſublimed acid, and more acidulous phlegm which is not cryſtallizable, are afforded: there remains at the bottom of the retort a grey or brown maſs, forming $\frac{1}{50}$ of the acid employed. If laid upon ignited charcoal in the air, it exhales in a very acrid white fume, which ſtrongly irritates the lungs, and leaves only a white reſidue without any coaly matter. Such is the reſult of the decompoſition of the oxalic acid by heat, as obſerved by Bergman. The Abbé Fontana obtained nearly double the product of gas; but this depends, as we have already ſhewn, upon the ſtronger heat he gave, with the intention of completely decompoſing this acid.

The concrete oxalic acid, expoſed to a moiſt air, remains deliqueſcent, but it rather becomes dry in a dry atmoſphere: cold water diſſolves half its weight. When the cryſtals of this acid are thrown into cold water, they produce a ſlight noiſe, which indicates a ſudden breaking of the particles. The ſpecific gravity of this cold ſolution is 1,0593, according to Mr. de Morveau. If the water of ſolution be evaporated, no acid vapour ariſes, even by ebullition. Boiling water diſſolves its own weight of this concrete acid ſalt. One half is precipitated in cryſtals by cooling. The oxalic acid diſſolves the baſe of alum," &c.

In this place is inſerted the matter from page 36 of the preſent volume, line 12, to line 2, on page 40; with the following additions.

P. 37, l. 12.

Add, "If the pure oxalic acid be added,

drop by drop, a precipitate is ſoon formed, which is known to be the oxalic acidule or ſalt of ſorrel, analogous to that of commerce."

P. 37, l. 17.

Add, " An exceſs of acid forms an acidulous oxalate of ſoda, of ſparing ſolubility."

—— l. 23.

Add, " An exceſs of this acid, poured into the ſolution of this ſalt, precipitates an ammoniacal acidulous oxalate, which falls down in cryſtals much leſs ſoluble than the pure neutral ſalt."

—— l. 6 (from the bottom).

Add, " which reduces it to carbonic acid."

At the end of the paragraph, line 2, p. 40, the extract from chapter V. of the old edition terminates, and the reſt of this ſixth chapter of the new edition is as follows :

" This celebrated chemiſt made all theſe combinations by employing the artificial oxalic acid, prepared by the nitric acid and ſugar. Sugar, as well as all mucilages, extracts, mild oils, and flour, afford, when treated by the nitrous acid, an acid perfectly ſimilar to the pure oxalic acid, as Scheele has aſcertained. All theſe matters, and even a great number of animal ſubſtances, as Berthollett has diſcovered, contain, therefore, the oxalic radical, to which oxigene only is wanted to convert it into oxalic acid.

Bergman is the firſt who diſcovered that ſugar, treated by the nitrous acid, formed an acid different from all others, and which was called the acid of ſugar or ſaccharine acid, for ſeveral years, until Scheele had ſhewn that this acid is abſolutely of the ſame nature as the oxalic acid, obtained from the ſalt of ſorrel by the proceſs before deſcribed. He has aſcertained this identity in the moſt convincing manner, by forming again the oxalic acidule of ſparing ſolubility, or the ſalt of ſorrel, by combining a ſmall quantity of ſoda with the ſaccharine acid. Here, therefore, we have a vegetable acid which does not exiſt as an acid except in a few vegetable ſubſtances, but whoſe baſe is extremely abundant in theſe matters, and which appears to paſs without alteration into the bodies of animals. We ſhall ſhew, in the following chapters, that this acid, like all the other vegetable acids, is probably a compound of hydrogene, carbone, and oxigene, and that it does not differ from them but in the particular proportions.

The oxalic baſe or radical appears to exiſt more abundantly in inſipid matters than in ſugar; though it was at firſt ſuppoſed that ſaccharine bodies afforded it in the greateſt abundance. Bergman obtained from ſugar no more than one third of its weight of oxalic acid, and Mr. Berthollett obtained from wool more than half the weight he made uſe of.

The pure oxalic acid is of no uſe, excepting in chemical laboratories, where it is more eſpecially employed to determine the preſence of lime. The oxalic acidule, or ſalt of ſorrel, is employed to take out ink-ſpots from white ſtuffs, wood, ivory, &c. which it does by virtue of its attraction for iron; but the pure oxalic acid might be advantageouſly ſubſtituted inſtead thereof, on account of its greater ſolubility."

CHAPTER VII.

[This chapter is entirely new written; the matter contained between the beginning of Section XII. page lxxxi and page lxxxvi line 2, of the Preliminary Diſcourſe, being incorporated into it with alterations and amendments. The chapter is as follows.]

" *Concerning the Vegetable Acids formed by the Action of Fire, and by that of the Nitric Acid.*

IT has long been known in chemiſtry, that many vegetable ſubſtances afford acid phlegms or liquors by diſtillation; but ſufficient attention had not been paid to theſe ſaline ſubſtances altered by fire. Since the diſcovery of ſo many acids, really differing from each other, whether by their intimate nature, or by a modification relative to the proportion of their principles, many of theſe ſalts have been obſerved to poſſeſs diſtinctive and particular properties. It has likewiſe been found, that ſome acids act upon vegetable matters in the ſame manner as heat, and that the nitric acid converts moſt of them into acids. In order to know theſe ſaline ſubſtances, whether new or modified, it will be neceſſary to examine them with care. We muſt firſt obſerve, that the vegetable acids, formed by the action of heat, muſt poſſeſs an analogy of nature or formation; it is on account of this analogy that we diſtinguiſh them by the generic names of empyreumatic acids; and to ſpecify each of them, we prefix the word pyro to the expreſſion, which indicates its origin; thus we ſay, the pyro-tartareous, pyro-mucilaginous and pyro-ligneous acids.

§ 1. *Concerning the Pyro-tartareous Acid.*

WE have already obſerved, that, in the diſtillation of the tartareous acidule, an acid phlegm is obtained, which is not the pure acid of that ſubſtance, but the ſalt altered in a peculiar manner. The hydrogenous gas and the carbonic acid gas, which are diſengaged at the ſame time, ſufficiently announce this alteration, becauſe it is at the expence of the principles of the acid of tartar that they are formed. As it is from heat that this alteration of the tartar ariſes, and as there is an oil driven up together with the diſtilled acid, which modifies the colour of this laſt, we have called this acid pyro-tartareous, and its ſaline combinations pyro-tartrites, according to the rules of the methodical nomenclature.

The firſt chemiſts who conducted their reſearches with ſome accuracy, determined, that by diſtillation they obtained one fourth of the weight of the tartar, conſiſting of an acid phlegm of a very penetrating ſmell, which was the pyro-tartareous acid. The rectification, or ſecond diſtillation of this acid, which has been recommended by a great number of authors, exhibits a very great difficulty, according to the academicians of Dijon, namely, that the rapid elevation of the liquid always burſt the veſſels, in ſpite of every care they took to moderate the heat, and leave room for the vapours. They attribute this elevation to the gas produced by the decompoſition of the acid, and compreſſed by the oil, againſt the preſſure of which it prevails at laſt by its great dilatation. However, this rectification may be diſpenſed with; and the acid, ſeparated from the oil by means of the funnel, is ſufficiently pure to exhibit all its diſtinctive characters.

The pyro-tartareous acid has an empyreumatic ſmell and taſte; it does not redden violets, but it does turnſole and blue paper; it diſengages the carbonic acid from its baſes, with a ſtrong effervеſcence: with earths and alkalis it forms ſalts, which are very different from thoſe conſtituted by the tartareous acid. Theſe ſaline compounds have not yet been examined: it is only known that the pyro-tartrites of potaſh and of ſoda are ſoluble in cold water, and are cryſtallizable; that it decompoſes the nitrate of ſilver, forming a grey precipitate ; that it does not decompoſe the nitrate of mercury but ſlowly ; that it does not decompoſe calcareous muriate ; and that its neutral ſalts are decompoſed by diſtillation with the vitriolic acid.

Chemiſts, before they arrived at the knowledge that hydrogene, carbone, and oxigene appear to be the true principles of all the vegetable acids, which differ from each other only in the proportions, had adopted opinions very remote from truth concerning the acid obtained by diſtillation from tartar. Vennel affirmed that it was the acid of nitre. Mr. Monnet, upon more poſitive experiments, imagined this acid to be the muriatic acid, diſguiſed by oil and mucilage. But though Scheele found a ſmall portion of muriatic acid in tartar, yet the cubic form of the neutral ſalt, produced by adding the pyro-tartareous acid to ſoda and the precipitation of the nitrate of mercury (two properties, on which Mr. Monnet eſtabliſhed the identity of the pyro-tartareous acid with the muriatic acid), are not, at preſent, ſufficient to chemiſts to aſcertain this identity ; beſides which, theſe experiments did not equally ſucceed in the hands of the chemiſts of Dijon. Meſſrs. Berthollett, Spielman, and Corvinus likewiſe did not ſucceed better. It is, on the contrary, very probable that the pyro-tartareous acid poſſeſſes no other principles than thoſe of the tartareous acid itſelf ; from which it appears to differ only in the quantity of thoſe principles: this modification is proved by the ſmell, the taſte, the want of cryſtallization, by all the other properties of this empyreumatic acid, and, more eſpecially, by the oil and the gaſeous carbonic acid, which is diſengaged from the tartareous acidule at the ſame time as the pyro-tartareous acid is formed.

Sufficient reſearches have not yet been made on this empyreumatic acid, to determine the order of its chemical attractions with earthy, alkaline, and metallic baſes.

§ 2. *Concerning the Pyro-mucilaginous Acid.*

BY the name of the pyro-mucilaginous acid, we diſtinguiſh that which is obtained from inſipid, ſaccharine, gummy, or farinaceous &c. mucilages, by diſtillation, and which Mr. de Morveau had at firſt named the ſyrupous acid. Chemiſts have long known that ſugar affords by diſtillation an acid phlegm, which is even of conſiderable ſtrength. Neuman, Cartheuſer, Geoffroy and Bucquet made particular mention of this acid, but without ever examining its properties. Mr. Schrickel is, of all the chemiſts, the perſon who has attended moſt particularly to this principle of ſugar.

By diſtilling ſugar, Mr. Schrickel obtained, from 16 ounces, 6 drams of phlegm, paſſing in white vapours, and condenſed in oily ſtreams of a penetrating ſmell of horſe-radiſh or roaſted bitter almonds, and of a yellow colour. He rectified it from clay; the acid paſſed clear, with a mild ſmell and a ſourer taſte. This acid, thus purified, did not cryſtallize; but when expoſed to cold, the aqueous part froze, and the portion which remained liquid, was much more concentrated.

Mr. de Morveau has obſerved, in preparing the pyro-mucilaginous acid, that the bottom of the retort was corroded. He does not attribute this corroſion to the acid, which does not exhibit that property when rectified, or when left a long time in the glaſs, but to the action and adherence of the carbure of iron or plombago, which exiſts in the reſidual charcoal left by the ſugar, and which he had heated very ſtrongly. This acid cannot be concentrated by the volatilization of the water which is united to it, becauſe it is itſelf as volatile as that fluid. It is this acid which exiſts in melaſſes, and, according to Mr. de Morveau, renders them deliqueſcent, and prevents their cryſtallization.

The pyro-mucilaginous acid, when concentrated by heat, is very penetrating, and ſtrongly reddens blue vegetable colours. It ſpots the ſkin of a red colour, as Cartheuſer long ſince obſerved; and this ſpot does not diſappear but with the epidermis. It riſes totally by the fire, and leaves only a brown trace; it is changed, for the moſt part, into gaſeous carbonic acid and hydrogenous gas, by cautious diſtillation in well-cloſed veſſels; it then affords a coaly reſidue, more abundant than when it is heated in open veſſels: part riſes without alteration.

Combined with barytes, magneſia, lime, potaſh, ſoda, and ammoniac, it forms neutral ſalts, which we call pyro-mucites, whoſe properties have hitherto been little examined, but which differ from all the known ſalts. It diſengages the carbonic acid from all theſe alkaline baſes with a ſtrong efferveſcence.

Though the property of diſſolving gold was formerly attributed to the ſpirit of honey, it appears certain that the pyro-mucilaginous acid does not touch this metal, nor platina, nor ſilver, nor even mercury; but it may, perhaps, diſſolve their oxides or calces. This acid corrodes lead, and becomes opaque in conſequence of the calx of this metal which is formed; the pyro-mucite of lead has the form of long cryſtals: it likewiſe attacks copper, and becomes green; it diſſolves tin, and attacks iron, with which it forms a cryſtallizable ſalt.

Its chemical attractions have been determined by Mr. de Morveau in the following order: potaſh, ſoda, barytes, lime, magneſia, ammoniac, clay, metallic calces, water, alcohol.

This empyreumatic acid has not yet been applied to any uſe; the ſpirit of honey, of manna, &c. was formerly uſed in pharmacy, but this uſage has long ſince been abandoned.

§ 3. *Concerning the Pyro-ligneous Acid.*

THE diſtillation of wood, more eſpecially beech, birch, and box, affords a brown acid liquid of a peculiar ſmell, and conſiderable ſtrength, which reddens blue vegetable colours, and cauſes an efferveſcence with mild alkalis. Boerhaave was acquainted with the product of box, guaiacum, juniper, and oak; but the chemiſts who have repeated the proceſs of Boerhaave have not examined the nature and particular properties of this acid. Mr. Goettling is the firſt who publiſhed, in 1779, in Crell's Journal, a memoir on the Acid of Wood, and more eſpecially its union with alcohol. This learned man made uſe of the bark of birch, which he diſtilled in an iron retort: the brown and oily acid which he obtained was left at repoſe for three months; he ſeparated, by the filtre, the drops of oil which aroſe to the ſurface, and poured a ſolution of potaſh into the liquor. A lively efferveſcence was produced, the liquor aſſumed a blood red colour, and after ſaturation with the alkali, and evaporation, it afforded a black ſalt, which was melted in an iron ladle, and purified by a ſecond ſolution and evaporation.

The pyro-ligneous acid may likewiſe be

rectified by diſtillation, according to Mr. Goettling.

The pyro-lignite of potaſh formed by this rectified acid becomes very hot by the addition of vitriolic acid, and the pyro-ligneous acid is diſengaged in a ſtate of conſiderable purity. This chemiſt, to whom we are indebted for theſe experiments, has obſerved, that the pyro-ligneous acid, ſeparated by means of the vitriolic acid, loſt its empyreumatic ſmell, but acquired that of garlick.

The chemiſts of Dijon employed the wood of beech to obtain this acid, which they diſtilled, and afterwards rectified the liquid product; 55 ounces of this wood in dry chips afforded them 17 ounces of rectified acid, of an amber colour, without mixture of oil, and whoſe weight, compared with that of diſtilled water, was in proportion of 49 to 48: 23 ½ ounces of lime-water were required to ſaturate one ounce of this acid. When gently heated, it riſes in vapour. A ſtrong heat decompoſes it as well as all the other vegetable acids. It cannot be obtained in the concrete form.

It combines with earthy and alkaline baſes, and forms peculiar ſalts, which we call the pyro-lignites of clay, of barytes, of magneſia, of lime, of vegetable alkali, of ſoda, and of volatile alkali. Theſe ſalts have not been yet examined with ſufficient attention to enable us to give a ſketch of their hiſtory. Mr. Eloy Bourſier de Clervaux has communicated, in the Dijon courſe of chemiſtry, experiments proper to determine ſome of the elective attractions of the pyro-ligneous acid. Calcareous earths and barytes adhere more ſtrongly to it than the alkalis; lime more ſtrongly than barytes; and magneſia more ſtrongly than the volatile alkali: ſo that the order of theſe attractions alone might ſerve to diſtinguiſh it from moſt of the other vegetable acids. It acts on ſeveral metals, and diſſolves moſt of their calces.

It ſeems as if all woods would afford the ſame acid by diſtillation, ſince box, birch, and beach have already afforded a ſimilar one. We perceive, however, what a number of experiments remain to be made to complete our knowledge of the properties and diſtinctive characters of this acid.

§ 4. *Concerning the Vegetable Acids formed by the Nitric Acid.*

BERGMAN has ſhewn that the nitric acid converted ſugar into an acid, which was at firſt thought to be different from all others, and was diſtinguiſhed by the name of the ſaccharine acid. Scheele has ſhewn, that this acid is abſolutely of the ſame nature as that which is partly neutralized by potaſh, in the ſalt of ſorrel: this identical acid is, therefore, at preſent, the oxalic acid. Several modern chemiſts, and more eſpecially Mr. Berthollett, have proved that the greateſt part of vegetable and animal matters afford this acid by means of that of nitre. It is certain, therefore, that the baſe, or oxalic radical, exiſts in a great number of ſubſtances, and generally in all thoſe which have been formed by the action of vegetable or animal life. The nitric acid acts in an equal and uniform manner upon all theſe ſubſtances; it always yields to them a greater or leſs quantity of its oxigene, and paſſes to the ſtate of yellow nitrous acid, nitrous gas, and even azotic gas, according to the proportion of oxigene which is diſengaged. Accordingly as the baſe or oxalic radical is more or leſs abundant in the different organic matters which contain it, a greater or leſs quantity of this acid is formed by the nitric acid. At the ſame time that the acid of nitre is decompoſed by organic ſubſtances, a certain quantity of carbonic acid gas is diſengaged, together with the nitrous or azotic gas; which proves that the organic matter has loſt a portion of its carbone, and that the oxalic acid which ariſes contains leſs of this principle than the ſubſtance which afforded it. Since ſeveral vegetable acids, and in particular that of tartar, paſs to the ſtate of oxalic acid by the action of the nitrous acid; and ſince carbonic acid is diſengaged during the time this converſion is effected, we ſee very well, that theſe vegetable acids have the ſame radical, and differ only in the proportion of oxigene.

It has been announced in the Nouvelles de la République des Lettres, for the year 1785, numbers 42 and 44, that Mr. Koſegarten obtained from camphor, by diſtilling nitric acid, eight ſucceſſive times from it, a concrete acid, cryſtallized in parallelopipedons, of a bitter taſte, and which reddened the tincture of violets and of turnſole. This ſalt, according to the chemiſt we have quoted, differs from the oxalic acid in not taking lime from the muriatic acid : it forms, with potaſh, a ſalt in regular hexagons ; with ſoda, a ſalt in irregular cryſtals ; with volatile alkali, priſmatic or needle-formed cryſtals ; and with magneſia, a ſoluble pulverulent ſalt. It diſſolves copper, iron, biſmuth, zinc, arſenic, and cobalt : but theſe firſt facts, which have not yet been confirmed, are not ſufficient to enable us to treat the properties of this acid in detail ; which, perhaps, is only a modification of ſome of thoſe we have deſcribed. If new reſearches concerning this acid ſhould diſcover peculiar properties different from thoſe of all others, its nature will be examined and characters deſcribed under the name of the camphoric acid, and of camphorates for the neutral ſalts.

Mr. Brugnatelli diſcovered, in 1787, that cork, upon which he had diſtilled four times its weight of nitric acid, left a yellowiſh thick acid maſs, ſoluble in water, of a ſour and ſlightly bitter taſte. This acid is not cryſtallizable :

ſtallizable: by a ſtrong evaporation, it is converted into a viſcid maſs reſembling wax, and which, like that ſubſtance, may be ſoftened and moulded between the fingers. It is ſoluble in alcohol, is converted into coal without taking fire upon ignited coals: with the earths and alkalis it forms deliqueſcent ſalts, ſeveral of which cryſtallize: laſtly, it has as ſtrong an attraction for lime as the oxalic acid, and forms with it a ſalt, inſoluble in water, but diſſoluble in the muriatic acid.

Without making any deciſion on the peculiar nature of this acid, Mr. Brugnatelli ſeems, nevertheleſs, to think that it differs from the oxalic acid. New experiments muſt decide whether this acid be really different, and it deſerves to be particularly examined, as well as that which Meſſrs. Prouſt and Angulo have diſcovered near Madrid, on the ſurface of chich-peas, in the veſicles placed at the extremity of the hairy fibres of this leguminous plant.

Such is the hiſtory of all the known vegetable acids: it remains, therefore, only to treat of thoſe which are formed by fermentation; but the beſt, and indeed the only known of theſe acids, is the product of an alteration which takes place in liquors already fermented. We ſhall place its hiſtory immediately after that of the ſpirituous fermentation, and its product.

CHAPTER VIII. of the new Edition.

Concerning the Saccharine Matter, Gums, and Mucilages.

THIS chapter is taken, with alterations and amendments, from chapters V. and VI. of the former edition. It commences as in page 31, and proceeds without alteration to page 33, line 13 from the bottom, where the following ſentence is inſerted: "This acid can be nothing elſe but that which is formed by heat, or the pyro-mucilaginous acid we have ſpoken of in the preceding chapter. As the liquor is quickly evaporated," &c. as in line 12.

P. 33, l. 3 (from the bottom).

Read, "By diſtillation it affords water, pyro-mucilaginous acid, and ſome drops of empyreumatic oil; at the ſame time that a great quantity of carbonic acid gas, and hydrogenous gas, holding charcoal in ſolution, are diſengaged. The reſidue," &c.

P. 34, l. 4.

Read, "acid vapour."

P. 34, l. 9.

Read, " Syrup, diluted with water, is capable of fermentation, of becoming a vinous liquor, and of affording alcohol by diſtillation."

—— l. 21.

After the word " ſummits," add, " which are the concrete oxalic acid." The reſt of the paragraph is left out, and the matter contained in the following pages, to the end of the paragraph, at the words " ſaccharine acid," is inſerted in the VIth. chapter of the new edition, as already noticed in page 199 of this Supplement.

The preſent chapter proceeds, as in line 7 from the bottom of page 41.

" Sugar is very extenſively uſeful," &c.

P. 43, l. 7.

Read, " It affords the concrete oxalic acid."

The ſubject goes forward as in chapter VI. without any ſubdiviſion.

P. 45, l. 11 (from the bottom).

Read, " liquid pyro-mucilaginous acid."

ALTERATIONS AND ADDITIONS IN CHAPTER VII.

(Numbered IX. in the new edition.)

P. 47.

Entitled, "*Of fixed Oils, or ſuch as are obtained by Expreſſion.*"

THROUGHOUT this chapter the Author has ſubſtituted the expreſſion "fixed oills," inſtead of "fat oils."

P. 49, l. 16.

Read, "It is at preſent proved that this thickening is due to the abſorption of atmoſpheric oxigene, becauſe all bodies which contain this principle, and yield it to fixed oils, ſuch as ſeveral acids, and eſpecially the oxigenated muriatic acid, metallic calces, thicken fixed oils, and bring them nearer to the ſtate of wax."

—— l. 11 (from the bottom).

Read, "by diſtilling theſe the pure ſebacic acid, which we ſhall ſpeak of in treating of the animal kingdom, and an oil," &c.

P. 53, l. 4 (from the bottom).

Read, "The ſulphur is volatilized, diſſolved in the diſengaged hydrogenous gas of the oil, and cannot be found again in the ſolid ſtate.

ALTERATIONS AND ADDITIONS IN CHAPTER VIII.

(Numbered X. in the new edition.)

P. 58.

IN the title of this chapter and elſewhere, the Author has ſubſtituted the expreſſion "volatile oil," inſtead of "eſſential oil."

P. 60, laſt line.

After the word "alkalis," inſert, "with which they form imperfect ſoaps, which we call ſavonules."

P. 61, l. 11.

Read, "The ſulphur is ſo greatly divided that it can no longer be extracted, and is ſeparated by heat, in the form of ſulphurated hydrogenous gas, or hepatic air."

ADDITION IN CHAPTER IX.

(Numbered XI. in the new edition.)

P. 64, l. 13 (from the bottom).

AFTER the full ſtop inſert, “ Mr. Koſegarten has diſcovered, as we have ſhewn in the VIIth. chapter, that the nitric acid, diſtilled eight ſucceſſive times from camphire, changes it into a cryſtallizable acid, which he believes to be of a peculiar nature.”

ALTERATIONS AND ADDITIONS IN CHAPTER X.

(Numbered XII. in the new edition.)

P. 66.

THE Author uſes the word "aroma" inſtead of "ſpiritus rector;" and he announces this change, by inſerting the following, in line 13 of the preſent page: "Inſtead of ſpiritus rector, we ſubſtitute the word aroma, from which the word aromatic, already ſo well known in our language, is derived."

P. 68, l. 2 (from the bottom).

Add, "Mr. Berthollett has found, that the oxigenated muriatic acid often deſtroys the ſmell of vegetables, and conſequently alters their aroma."

P. 70, l. 11.

Inſtead of the three following lines, read, "and that it is this combuſtible ſubſtance, reduced to the ſtate of elaſtic fluid by its combination with hydrogene, which conſtitutes the aroma of cruciferous plants."

ALTERATIONS AND ADDITION IN CHAPTER XI.

(Numbered XIII. in the new edition.)

P. 74, l. 4 (from the bottom).

INSERT, "We have explained the properties of this acid in one of the preceding chapters."

P. 75, l. 6.

The paragraph beginning with the words "Bergman and Scheele" is omitted.

P. 76, l. 1.

After the word "examined," the remainder of the paragraph runs thus: "It is thought that it does not eſſentially differ from the acid of benzoin."

CHAPTER XII.

(Numbered XIV. in the new edition.)

IN this chapter there are no alterations.

ADDITION IN CHAPTER XIII.

(Numbered XV. in the new edition.)

P. 87, l. 5 (from the bottom).

INSERT, "I have examined the juice of caout-chouc, which was ſent to me from Madagaſcar. This juice was as white as milk, of an inſupportable fœtid ſmell. It contained a white concrete ſpungy matter, which occupied the middle of the bottle, whoſe form it had aſſumed, and which was elaſtic. By heating the liquor, a white pellicle was ſoon formed at the ſurface, conſiſting of true elaſtic reſin. Alcohol, mixed with the juice, ſeparated this reſin in flocks.

The dry caout-chouc, ſuch as it is brought to Europe, expoſed to the heat of a fire, ſoftens, ſwells, emits a fœtid odour, and burns at the ſame time that it ſhrinks."

CHAPTER XIV.

(Numbered XVI. in the new edition.)

THIS chapter is not altered.

CHAPTER XV.

(Numbered XVII. in the new edition.)

THIS chapter is not altered.

CHAPTER XVI.

(Numbered XVIII. in the new edition.)

THIS chapter is not altered.

ALTERATION IN CHAPTER XVII.

(Numbered XIX. in the new edition.)

P. 119, l. 13.

THE two following ſentences, beginning with the words " this fact," and ending with the word " accuracy," are left out.

CHAPTER XVIII.

(Numbered XX. in the new edition.)

THIS chapter is not altered.

CHAPTER XIX.

(Numbered XXI. in the new edition.)

THIS likewiſe is not eſſentially altered.

ALTERATION IN CHAPTER XX.

(Numbered XXII. in the new edition.)

P. 147, l. 4.

AFTER "colouring matter," the paragraph ends thus: "and of an aroma, which is loſt or modified by the action of fire. We are acquainted with the nature and properties of moſt of theſe ſubſtances; ardent ſpirit, therefore, only remains to be treated of."

ALTERATIONS AND ADDITIONS IN CHAPTER XXI.

(Numbered XXIII. in the new edition).

P. 160, l. 13 (from the bottom.)

INSTEAD of the concluding line of this paragraph, read, " and that part of the hydrogene, or principle of the ſpirit, forms water with this oxigene, while the alcohol, deprived of this portion of this oxigene, forms ether. But the whole which paſſes in this operation is not known."

P. 162, l. 7.

The remainder of this paragraph runs as follows: " Mixed with the muriatic ſolution of gold, it retains a part of that metal, and in this caſe appears to act like the volatile oils, which likewiſe retain a portion of the calx of gold. Like alcohol, it diſſolves volatile oils and reſins, and accordingly phyſicians often uſe ethereal tinctures."

P. 176, l. 2.

Read, " diſtilled ſpirituous waters."

CHAPTER XXII.

Concerning Tartar.

THIS chapter is inſerted in chapter VI. of the new edition. See page 185 of this Supplement, where the variations are noted.

ALTERATIONS AND ADDITIONS IN CHAPTER XXIII.

(Numbered XXIV. in the new edition.)

P. 200, l. 1.

READ, "The preſence of this ſalt influences the developement of the properties of vinegar."

P. 211, l. 6 (from the bottom).

Inſert, "or rather the ſame which the ſulphuric acid has to the ſulphureous acid, or that which the nitric acid has to the nitrous acid."

P. 212, l. 9 (from the bottom).

Inſert, "Mr. de Laſſone has ſhewn, that the ammoniacal ſalt formed by radical vinegar, or the acetic acid, is very different from that formed by the common acetous acid, and called ſpirit of Mindererus: Although we do not poſſeſs a ſufficient knowledge of the properties of all the acetates, yet their form, taſte, ſolubility, &c. ſufficiently ſhew that they really differ from the acetites. The Marquis of Courtanvaux," &c. as in the line above referred to.

P. 213,

P. 213, l. 2.

In this place is inſerted the paragraph, beginning with the words "Radical vinegar," upon page 214, and the two following paragraphs on page 215, as far as the word "combuſtion" at line 19; after which the following paragraph is inſerted:

"A great number of reſearches remain to be made by chemiſts concerning the acetic acid: the properties we have treated of are ſufficient to ſhew, 1. That it remarkably differs from the acetous acid, or common vinegar. 2. That this difference depends on the oxigene, which is more abundant in the acetic than in the acetous acid; which exceſs has been taken by the latter from the calx of copper. We ſhall now proceed to examine ſome other properties of common vinegar.

The acid of vinegar," &c. and proceed as in line 3, page 213.

P. 214 and 215.

It has already been remarked, that the three paragraphs, from the words "Radical vinegar" to the word "combuſtion," are tranſpoſed to page 213; the ſubject, therefore, is continued by proceeding to line 20 on page 215. "Vinegar is much uſed," &c.

CHAPTER XXIV.

(Numbered XXV. in the new edition.)

THIS chapter is not altered.

PART IV.

P. 222.

THE Author has transferred the firſt eight chapters of this part to the beginning of his fifth volume, without any material alteration, except the following.

P. 239, after l. 11.

Inſert, " Since the work of Mr. Daubenton, the Count de la Cepede has publiſhed a very extenſive and accurate work upon oviparous quadrupeds, in which he has exhibited a particular method. This arrangement will be found in the fifth table, extracted from the work of Mr. de la Cepede." The table is inſerted at the end of this Supplement, No. 1.

P. 255, at the bottom,

The Author takes notice that ſeveral celebrated naturaliſts have laboured on the ſubject of inſects ſince Geoffroy; and, in particular, that he has not thought proper to adopt the method of Mr. Fabricius, becauſe more complicated and embarraſſing than that which he has uſed.

This fourth part, therefore, begins with

CHAPTER IX.

P. 279.

(Numbered I. in the new edition.)

THE Author has annexed a note, informing the reader of the tranſpoſition of the firſt eight chapters. No eſſential alteration is made in this chapter.

ADDITION IN CHAPTER X.

(Numbered II. in the new edition.)

P. 299, l. 2 (from the bottom).

ADD, "It ſeems to be in the fibrous ſubſtance that the particular acid exiſts, which the blood affords by diſtillation, and which Mr. Chauſſier obtained by the action of alcohol. For this reaſon I have propoſed to call it the cruoric acid, if it ſhould hereafter be found to be a peculiar acid.

ALTERATION AND ADDITION IN CHAPTER XI.

(Numbered III. in the new edition.)

P. 301, l. 7.

ADD, "It has always been ſuppoſed that the milk is ſeparated immediately by the mammary glands from the blood that paſſes through the numerous arteries with which they abound; but the principles found in milk have not yet been ſhewn to exiſt in the blood. Modern anatomy has taught us that the breaſts are provided with a great number of lymphatic and abſorbent veſſels, placed in a fatty membrane; the fluid they contain is probably one of the principal materials of milk."

P. 313, l. 5.

Inſtead of the paragraph as here given, the Author has ſaid ſimply, "From all theſe facts it appears, that cheeſe is a ſubſtance reſembling the albumen of the blood."

ALTERATIONS AND ADDITIONS IN CHAPTER XII.

(Numbered IV. in the new edition.)

P. 322, l. 14.

READ, "It decompoſes the tartrite of potaſh by precipitating cream of tartar, or the acidule of tartar; and it likewiſe decompoſes the acetous alkaline ſalts. When ſtrongly heated," &c. as in line 17.

P. 324, l. 7.

Read, "It is a kind of fixed oil, rendered concrete by a notable quantity of acid, and by oxigene, or the baſe of vital air."

P. 327, l. 3.

Inſert, "With regard to the ſalt, which M. Cadet mentions in the charcoal of bile, as being analogous to ſugar of milk; it is very clear that this ſubſtance could not have reſiſted the ſtrong heat requiſite to reduce the bile to the ſtate of coal."

—— l. 16.

Add, "He has likewiſe diſcovered that bile which is altered, and has become of a brown, dirty, turbid colour, emitting a fœtid ſmell, becomes by this treatment of a fine green, and loſes its ſmell, at the ſame time that ſome whitiſh concrete flocks are ſeparated.

P. 329, l. 16.

Add, "But it is probable that this pretended ſaline matter is rather analogous to the foliated, brilliant, and cryſtallized ſubſtance which Mr. Poulletier found in the human biliary calculi, and of which we ſhall proceed to ſpeak."

P. 330, l. 17.

Add, "Some perſons attribute particular virtues to the gall of fiſhes; but experience has afforded no proof of this aſſertion, which muſt be claſſed among the numerous prejudices which exiſt reſpecting the materia medica."

——l. 4 (from the bottom).

Inſert, "I diſtinguiſh three varieties; the firſt are brown, blackiſh, irregular, tuberculated, and as it were of a crumbly texture: the ſecond are harder, brown, yellowiſh, or greeniſh; they exhibit concentric layers, and are often covered with a dry, even, and greyiſh cruſt. Their form is uſually angular and polyhedral. The third variety includes white, egg-ſhaped concretions, more or leſs irregular, with a whitiſh and frequently uneven covering, formed of ſparry ſtrata, or cryſtalline tranſparent laminæ, and often radiated from the centre to the circumference.

The biliary calculi of the ſecond variety have been examined by," &c. as in line 2.

P. 331, l. 12.

Inſert, "This very ſingular fact likewiſe requires confirmation, for M. Vauquelin and myſelf have obſerved a ſmall quantity of lamellated matter in the calculi of oxen."

—— l. 18.

Read, "biliary calculi of the ſecond variety above deſcribed."

—— l. 6 (from the bottom).

Inſert, "I have collected two others entirely ſimilar, which were given me by my aſſociates Meſſrs. Preux and Halle."

—— laſt line.

The following paragraph is omitted, ending on p. 332, l. 12.

P. 332, at the bottom.

Add, "Nevertheleſs, it muſt not be imagined that theſe remedies, however active and volatile they may be, can arrive in ſufficient quantity into the bladder to diſſolve the biliary calculi with the ſame efficacy as they do in our experiments. I think, that the ceſſation of ſpaſm, and the dilatation of the gall-duct which follows, is the true cauſe of the good effects of the ethereal mixtures propoſed by Mr. Durande, whom I adviſe to ſuppreſs the oil of turpentine; more eſpecially as it appears to be proved, that, though it be in other reſpects very heating, it has no other advantage than that of diminiſhing the volatility of the ether; and that it is already proved from obſervation, that white of egg, and doubtleſs many other ſubſtances, might be employed for the ſame purpoſe, and without producing the ſame inconveniences."

ALTERATIONS AND ADDITIONS IN CHAPTER XIV.

(Numbered XVI. in the new edition.)

P. 336, l. 5 (from the bottom).

INSERT, " Meſſrs. Macquart and Vauquelin have found evident acid properties in the gaſtric juice of oxen, calves, and ſheep; but it follows, from their exact experiments, that this character is derived from the diſengaged phoſphoric acid: they have likewiſe aſcertained, that theſe juices alter and putrefy readily enough. It appears that the gaſtric juice of carnivorous animals poſſeſſes the antiſeptic property moſt eminently."

P. 337, l. 6.

After the word " ſubſtances," inſert, " and which is even ſaid to be capable of attacking ſiliceous ſtones."

——l. 2 (from the bottom).

Inſtead of the ſentence " Time and experience," &c. inſert, " But the experiments of Meſſrs. Macquart and Vauquelin, above ſpoken of, and which were made in my laboratory, prove that this antiſeptic quality does not belong to the gaſtric juice of ruminating animals."

CHAPTER XV.

(Numbered VII. in the new edition.)

THIS chapter is not altered.

ALTERATIONS AND ADDITIONS IN CHAPTER XVI.

(Numbered VIII. in the new edition.)

P. 344, l. 2.

ADD, " or by the abſorbent veſſels."

—— l. 12.

After the words " phoſphoric ſalt," add, " and the acid of the ſtone of the bladder."

P. 345, line the laſt.

The Author has annexed a note, obſerving that Coldevillars had mentioned, in his Courſe of Surgery, that urine conſtantly reddens the tincture of turnſole.

P. 346, l. 12.

Inſtead of " holds," read, " appears to hold."

——l. 5 (from the bottom).

The laſt five lines of this page are omitted.

P. 351, l. 5.

Add, " until the effervefcence ceaſes, and the ſaturation of the acid is complete."

CHAPTER XVII.

(Numbered IX. in the new edition.)

THIS chapter is not altered.

ALTERATIONS AND ADDITIONS IN CHAPTER XVIII.

(Numbered X. in the new edition.)

P. 377, l. 15.

AFTER the word " dark," inſert, " This rapid combuſtion takes place with a very ſtrong heat, and dazzling light, in a receiver full of vital air."

P. 381, l. 16.

Inſert, " Mr. Pelletier has obſerved that copper combines very well with phoſphorus, and that the reſult of this combination is a kind of grey, brilliant, granulated, very hard, and infuſible ore. We give to theſe compounds, into which phoſphorus enters without alteration, the name of phoſphures of copper, zinc, arſenic, &c."

ALTERATIONS AND ADDITIONS IN CHAPTER XIX.

(Numbered XI. in the new edition.)

P. 383.

THE title of the chapter is,

"*Concerning the Phoſphoric Acid and the Phoſphoreous Acid.*"

In this chapter, the Author makes a diſtinction between the phoſphoric acid and the phoſphoreous acid, or phoſphoric acid which holds phoſphorus in ſolution; and he has accordingly divided the chapter into two ſections, as expreſſed in the title. After the deſcription of the general proceſſes for acidifying phoſphorus, in which he remarks that the three firſt afford the phoſphoric, and the latter the phoſphoreous acid,

P. 385, l. 4.

The Author has eraſed the laſt four lines of the paragraph, and begins to treat of the phoſphoric acid in the enſuing paragraph, which he has altered as follows:

“ *Concerning the Phoſphoric Acid.*

THE pure phoſphoric acid, obtained without addition of water and in vital air, has the form of white, ſnowy, light, deliqueſcent flocks, of a very ſtrong acid taſte. By expoſure to the air, it ſtrongly attracts humidity. When placed in contact with a ſmall quantity of water, it melts or is diſſolved eaſily, and affords a white fluid without ſmell, of an oily conſiſtence, very ponderous, of a ſtrongly acid taſte, and rapidly converting blue vegetable colours into red. If it be expoſed to the action of heat in a retort, pure phlegm is obtained; the acid becomes concentrated, and acquires a greater ſpecific gravity than even the ſulphuric acid, gradually becomes more conſiſtent, loſes its tranſparency, and reſembles a ſoft extract: laſtly, when urged by a violent heat, it melts into a hard, very electric, and inſoluble tranſparent glaſs, which preſents no character of acidity. It ſeems that this vitreous and ſolid ſtate of phoſphorus depends on a more intimate combination between the acidifiable baſe and oxigene and the ſeparation of part of the latter. This idea reſpecting the more intimate adherence of the baſe of air,” &c. as in line 2, p. 386.

P. 387, l. 13 (from the bottom).

Eraſe the words “ and even by the cauſtic fixed alkali.”

P. 388, l. 12 (from the bottom).

Inſtead of the remaining lines of the paragraph, inſert, " does not cryſtallize but with difficulty, and is often reduced by evaporation into a gummy deliqueſcent matter, tenacious and adheſive like turpentine. I have obſerved in this thick matter, needles diſpoſed in radii, which denoted a commencement of cryſtallization. But if a little more ſoda be added to this ſalt, than is neceſſary to ſaturate its acid; this exceſs of baſe, which it is capable of taking up, immediately changes its properties; its taſte becomes urinous; it converts the ſyrup of violets to a green; it cryſtallizes in large parallelograms, and effloreſces in the air: in a word, it aſſumes all the properties of the fuſible ſalt with baſe of natrum, which we call the ſuper-ſaturated phoſphate of ſoda. This ſalt does not afford phoſphorus with charcoal: however, the phoſphoric ſalts of ponderous earth, lime, vegetable alkali and ſoda, likewiſe do not afford it; and it ſeems neceſſary that the phoſphoric acid ſhould be in a diſengaged ſtate before it can be decompoſed by charcoal."

P. 389, l. 4.

Inſtead of the laſt four lines of this paragraph, read, " I have obſerved that when the combination is accurately neutral, it is very difficult to obtain it cryſtallized, and that it almoſt totally evaporates by a gentle heat;

but an exceſs of volatile alkali favours the cryſtallization of this ſalt: a ſmall quantity of the phoſphate of ſoda produces the ſame effect, and in this ſtate it is that we obtain it from urine. Ponderous earth, lime, and alkalis decompoſe the ammoniacal phoſphate: fire readily diſengages its volatile alkali, and it is on this account that it affords phoſphorus with charcoal."

P. 389, l. 3 (from the bottom).

Inſert, "in which it occaſions precipitates.

The nitric and acetous ſolutions of lead are equally precipitated by the phoſphoric acid, and by the ſoluble phoſphoric ſalts: the precipitate afforded by the decompoſition of theſe laſt, or the phoſphate of lead, affords phoſphorus by diſtillation with charcoal."

P. 391, l. 3.

Inſert, "Mr. Haſſenfratz has extracted it from a great number of plants which grow in the marſhes, and from the earthy part of turf."

—— l. 7.

Add, "Laſtly, Mr. Prouſt has found it combined with lime, in a ſparry ſtone, from Spain."

——l. 11.

At the end of the chapter the following is added:

" *Concerning the Phoſphoreous Acid.*

WE have obſerved, that when phoſphorus burns ſlowly, and does not become entirely ſaturated with oxigene, it forms an acid different from the former, and which has the ſame relation to it as the ſulphureous acid has to the ſulphuric acid, the nitrous acid to the nitric acid, and the acetous acid to the acetic acid: this diverſity of the proportion of oxigene in this acid, cauſes a very great difference in its properties, as is obſerved in the other three acids. The phoſphoreous acid may likewiſe be conſidered as the phoſphoric acid, holding a ſmall quantity of phoſphorus in ſolution. This acid aſſumes a fœtid and diſagreeable ſmell when it is rubbed, and eſpecially when it is heated; part is volatilized in the form of a white vapour, which is very acute and penetrating: it is, therefore, much more volatile than the phoſphoric acid; but this phoſphoreous acid never riſes wholly in vapour like the ſulphureous acid, and always contains a greater or leſs quantity of phoſphoric acid, for which reaſon it leaves a vitreous reſidue, or melted phoſphoric acid, when treated with a ſtrong heat. It may be prepared by decompoſing the phoſphoric acid, and there is always a certain quantity diſengaged in the operation of making phoſphorus. All the diſtinctive properties of the phoſphoreous acid have not been examined in detail;

but thoſe which have been obſerved are ſufficient to indicate the difference between this acid and the phoſphoric acid. Mr. Sage, in the Memoirs of the Academy for the year 1777, has ſhewn ſome of the characteriſtic properties of the phoſphoreous acid. According to this chemiſt, the ſalt which reſults from the acid obtained by the deliquium of phoſphorus, when united to potaſh, or the phoſphite of potaſh, is not deliqueſcent; the phoſphite of ſoda is likewiſe cryſtallizable, and not deliqueſcent; the ammoniacal phoſphite, on the contrary, attracts the humidity of the air."

CHAPTER XX.

(Numbered XII. in the new edition.)

THIS chapter is not altered.

CHAPTER XXI.

(Numbered XIII. in the new edition.)

P. 405, at the bottom of the text.

THE Author has obſerved, that, in the making of phoſphorus from the acid of bones, the evaporation ſhould be carried on till it has the conſiſtence of an extract, and the diſtillation muſt then be made with charcoal.

The reſt of the chapter is as it ſtood in the former edition.

ALTERATIONS AND ADDITIONS IN CHAPTER XXII.

(Numbered XIV. in the new edition.)

P. 411, l. 10 (from the bottom).

READ, " A prodigious quantity of elaſtic fluid is diſengaged, conſiſting of a mixture of carbonic acid gas, azotic gas, and hydrogenous gas, holding charcoal and even volatile oil in ſolution. This laſt is gradually precipitated in cooling, and adheres to the ſides of the glaſs jars in which the elaſtic fluid is preſerved."

P. 413, l. 7 (from the bottom).

Add, " There are ſeveral manufactures of theſe candles in England, and there has been one eſtabliſhed at Paris for ſome years paſt."

P. 414, l. 8 (from the bottom).

Add, " It really differs from wax: it appears to be, with reſpect to the former of theſe oils, the ſame which reſin is to the latter."

P. 415, l. 8.

Add, " It appears to me that this ſubſtance is very abundant in the animal kingdom, and that it is an oil which particularly belongs to this kingdom."

In this place the Author has inſerted the matter of chapter xxvii. page 434, of the third volume, concerning ambergris.

After which he proceeds to treat of the eggs of birds, as in the page firſt mentioned.

ALTERATIONS AND ADDITIONS IN CHAPTER XXIII.

Page 418.

THE Author has continued the ſubject without making the diviſion of a chapter in this place.

P. 418, l. 2 and 3 (from the bottom).

Eraſe the words " zoophagous—whoſe humours are more attenuated than moſt quadrupeds."

P. 419, l. 11 (from the bottom).

Inſert, " But theſe virtues may be doubted."

P. 422, l. 12 (from the bottom).

Add, " Its attractions have been diſpoſed in the following manner by Meſſrs. Ardwiſſon, and Oerhne: ponderous earth, vegetable alkali, mineral alkali, lime, magneſia, volatile alkali, zinc, mangane ſe, iron, lead, tin, cobalt, copper, nickel, biſmuth, ſilver, clay."

P. 427, l. 10.

Read, " it affords the acid of fat, or ſebacic acid."

P. 428, l. 5.

Inſert, " In the ſeparation by alcohol, this fluid carries the liquor through the filtre, and there remains on the paper a fat orange-colour oil, a gummy matter, and a ſmall quantity of gluten. To obtain the bombic acid, or acid of ſilk-worms, in a ſtate of purity, the alcohol muſt be diſtilled : this laſt comes over, and the acid remains alone in the retort."

P. 431, l. 9.

For " ſtrong," read, " ſtoney."

CHAPTER XV. of the new Edition.

P. 243.

[This chapter is inſerted after chapter xxiii of the former edition, and is new. Its title is as follows.]

"*Reſult of the Analyſis of Animal Subſtances; Compariſon of theſe Subſtances with Vegetable Matters.*

IN the fourteen preceding chapters, we have exhibited the actual ſtate of our preſent knowledge concerning the nature of animal ſubſtances. Thoſe who have cultivated chemiſtry for the laſt twenty years, will eaſily perceive how much that ſcience has gained in this reſpect, and the ſingular progreſs it has made in this department. Though a much greater number of diſcoveries, beyond what is at preſent known, remains to be made, to complete the hiſtory of animal matters, yet thoſe which we at preſent poſſeſs are of much greater value than what we formerly poſſeſſed. The courſe neceſſary to be held in this great work is at leaſt diſcovered, and we need be no longer apprehenſive of conſuming our time in falſe purſuits; it is clearly ſeen how much the philoſophy of animal ſubſtances and the ſcience of medicine may expect from chemiſtry, when theſe two ſciences are connected together. If this aſſertion required any additional proofs to what we have already given in detail in the foregoing chapters, the ſhort reſumption we ſhall exhibit in this place would be ſufficient to anſwer their purpoſe.

Thoſe ſubſtances which have been called the immediate principles of organic bodies, that is to ſay, the matters which are ſeparated immediately and without alteration from organized ſubſtances, greatly reſemble each other; whether they be extracted from animals or vegetables. In fact, we find in both, extracts, the ſaccharine principle, inſipid mucilages, acid and alkaline ſalts, fixed and volatile oils, reſins, glutinous matter, an aromatic principle, and colouring ſubſtances. But notwithſtanding this analogy, which has long been perceived, there ſtill remain among the immediate principles of the two kingdoms, very remarkable differences, the examination of which deſerves all the attention of philoſophers.

1. The extract and ſaccharine matters are very far from being as abundant in the animal as in the vegetable kingdom.

2. The animal mucilages are not entirely of the ſame nature; they are ſofter, not ſo eaſily dried, and are diſpoſed to attract the humidity of the air; they take the form of a jelly in cooling;

their taſte is ſtronger, they become ſour, and more eſpecially they putrefy much more rapidly.

3. The fixed oils in the animal kingdom likewiſe differ from thoſe of vegetables. They are found collected in greater maſſes and in particular cells; they are always more or leſs concrete; and in many inſtances they are even capable of becoming dry, and aſſuming the cryſtalline form.

4. Volatile oils and reſins are in general rarer, and much leſs abundant, in animals than in vegetables. It ſeems as if Nature had been careful to remove from the ſenſible and irritable organs of animals, ſuch acrid ſubſtances which would have continually ſtimulated the fibres; and that ſhe has even confined them to the external parts, and the vicinity of the tunics in vegetables.

5. The albuminous matter, which is concreſcible by heat, though it exiſts in the juices of plants, is much leſs abundant in them than in animals; in all the parts of which it is found, and often in very conſiderable quantities.

6. The fibrous ſubſtance, though analogous to the gluten of flour, has, nevertheleſs, more tenacity and elaſticity in animals: beſides which, they contain it in ſo large a proportion that, even if there were no other difference between animals and vegetables, this alone would deſerve to employ the whole attention and reſearch of philoſophers. All the muſcles,

cles, or all the organs of motion, are compoſed of this; and as animals poſſeſs a mobility which is not ſeen in vegetables, the parts neceſſary to move them ought to differ eſſentially from that which conſtitutes the motionleſs bodies of plants.

7. But it is more eſpecially in the nature of their ſaline matters, that animals differ from vegetables. Beſides the ſalts and ſaline radicals analogous to thoſe of the vegetable kingdom, which are found in animals, ſuch as lime, ſoda, the muriatic, oxalic, malic, benzoic, ſebacic, and phoſphoric acids, there have been extracted from them the lactic, ſaccho-lactic, lithic, formic, and bombic acids, whoſe nature is not known, but which do not appear to exiſt in vegetables. We likewiſe find in animals, much more abundantly than in vegetables, the principles neceſſary for the formation of volatile alkali and the Pruſſian acid; and it is more particularly by this character that animal matter differs from vegetable. The principles neceſſary to the formation of ammoniac, or volatile alkali, and the Pruſſian acid, are even ſo abundant in animal ſubſtances, that theſe two compounds are very often found ready formed in them, more eſpecially ſome time after the death of animals. I have found Pruſſian blue in putrid animal ſubſtances: I have even ſeen in a ſick perſon, whoſe blood was greatly altered, this fluid aſſume the brighteſt blue colour by expoſure to air. But

it muſt not be overlooked, that vegetables likewiſe contain the principles of Pruſſian blue, though much leſs abundantly than animalſubſtances. With regard to volatile alkali, its readier and much more frequent formation in animal than in vegetable matters, ſhews that its principles are much more abundant; and indeed Mr. Berthollett has proved, that theſe matters afford a very great quantity of azotic gas, by means of the nitric acid. I have proved after him, that, when this gas is extracted, theſe ſubſtances no longer afford ammoniac, or volatile alkali; it is, therefore, to the preſence of this principle that they are indebted for the property of affording, in theſe artificial or ſpontaneous analyſes, a great quantity of this alkaline ſalt.

If we proceed to inquire what are the more ſimple firſt principles of which theſe immediate principles are compounded, we ſhall find, that the only component parts of animal matters are, like thoſe of vegetables, hydrogene, carbone, azote, and oxigene. Theſe ſubſtances, hitherto indecompoſable, theſe kinds of elements, appear to conſtitute, by their combinations, oils, acids, mucilages, the fibrous matter, &c. Theſe various immediate principles do not differ from each other, but in the number and reſpective proportion of the primitive ſubſtances which compoſe them. But as animal matters, though formed in general of the ſame principles as vegetable ſubſtances, do neverthelefs poffefs properties really different; the productive cauſe of theſe differences appears to exiſt only in the various proportion of theſe principles. Thus the quantity of azote, which is much more conſiderable in animal matters than in vegetable ſubſtances, already explains a great part of theſe differences: it ſhews why animal ſubſtances afford much ammoniac by the action of fire, why they putrefy ſo readily, why they are neceſſary to the production of the acid of nitre, &c. Nothing more is required to be done than to determine what kind of change it is that vegetable matters undergo, in paſſing into the bodies of animals; for it is certain that vegetable matters alone afford nouriſhment to animals, and are converted into their proper ſubſtance. We ſhall here take notice, that ſeveral immediate principles of vegetables paſs without alteration, and preſerve their own proper nature in the bodies of animals, or at leaſt are very little changed: ſuch in particular are ſeveral ſalts, the fixed oils, &c. But the different kinds of mucilages, the gluten, and the colouring matters, manifeſtly change their nature; the gummy matter becomes gelatinous; the gluten paſſes to the ſtate of fibrous matter; the baſe of azotic gas is fixed, and combines in great quantities in theſe ſubſtances, and ſeems, by its mere fixation, to change vegetable into animal matter. It is to this change, and the formation of the various animal ſubſtances, that phyſiologiſts ought to direct their attention more particularly: in a word, it is the problem of animalization which remains to be reſolved. Analyſis has already afforded ſome uſeful data for this ſolution; but many more remain to be inveſtigated: and it is chemiſtry alone which, by its accurate proceſſes, can encourage us to hope for the union of a number ſufficiently conſiderable to arrive at this reſult, ſo uſeful to the philoſophy of animal bodies.

ALTERATION IN CHAPTER XXIV.

(Numbered XVI. in the new edition.)

P. 441, l. 3.

THE concluding paragraph is omitted, and the Author proceeds to add the following new matter:

"Thus far we have only deſcribed the phenomena which take place when animal matters putrefy, and are decompoſed in the air: but as the reſult of this decompoſition in different mediums throws great light on the knowledge of the revolutions of the globe, let us conſider for an inſtant what happens to theſe matters, plunged in the water, or buried in the earth.

The changes hitherto deſcribed, do not take place perfectly in the water. The bodies of animals plunged in this liquid firſt ſwell up; elaſtic fluids are diſengaged; the water diſſolves a great part of their principles, decompoſes another part, and diſperſes the different principles of theſe bodies among the great maſſes that conſtitute rivers and ſtreams; whence ſeveral nations expoſe dead bodies in rivers, and commit their deſtruction to the water.

Other phenomena take place when bodies

are buried beneath the ground. Obſervations, moſt of which are the conſequence of accidental circumſtances, have ſhewn that their deſtruction varies according to the nature of the ground. Sometimes we find bodies entirely deſtroyed after a ſhort interval, and ſometimes they are found well preſerved even after a very long time. It is eaſy to conceive, that if the earth is very porous and very moveable, if the animal matter be buried at a ſmall depth, the air, and eſpecially the water, which have an eaſy acceſs to it, will facilitate its decompoſition; but that in oppoſite circumſtances it muſt be much ſlower. For example, dry earth abſorbs the water of bodies, dries them, and converts them into mummy: ſuch is the effect of a ſandy ſoil, in which the bodies receive the impreſſion of a burning ſun, and acquire a degree of hardneſs which defends them from deſtruction for ages. On the contrary, argillaceous earth retains water, and permits the deſtruction of bodies. In the caſes in which it takes place more or leſs ſlowly, the fluids and the ſolids finiſh, by being reduced almoſt entirely into azotic gas, carbonic acid gas, hydrogenous gas, and alkaline gas. All theſe elaſtic fluids being filtered through the earth, are ſtopped and partly fixed, and render the ground black, greaſy, and fetid. They ſaturate it, as it were, with theſe products of putrefaction, until the diſſolving power of water and air, the vaporization effected by heat, and the abſorption by vegetables, deprive the ground of the fluids with which it is impregnated. Thus it is that nature, by ſlow decompoſitions, reduces the bodies of animals deprived of life, to more ſimple ſubſtances deſtined to enter into new combinations.

This decompoſition, conſidered on every part of the globe at once, in the earth, in the water, or in the air, produces great changes, which the philoſopher ought to appreciate. By obſerving the vaſt extent of the ſeas, and the immenſe quantity of animals which inhabit them, we perceive thoſe animals periſh in enormous maſſes, and ſuffer a decompoſition, which produces phenomena hitherto not ſufficiently examined. What become of the immenſe remains of animal matters? To what ſucceſſive revolutions are theſe ruins of living beings expoſed?—It is known that the waters of the ſea contain the marine and vitriolic ſalts of ſoda, of lime, and of magneſia. It cannot be doubted, but the muriatic acid, magneſia, lime, and ſoda, are continually formed in this vaſt laboratory. Perhaps the formation of many of theſe ſubſtances may take place during the life of theſe marine animals; but ſome others are certainly due only to the decompoſition of the ſame ſubſtances after death. It cannot be denied, that the ſtrata of calcareous matters, which conſtitute as it were the bark or external covering of the

globe,

globe, in a great part of its extent, are owing to the remains of the ſkeletons of ſea animals, more or leſs broken down by the waters; that theſe beds have been depoſited at the bottom of the ſea; that ſuch is likewiſe the origin of bitumen, and more eſpecially pit-coal, which is depoſited in very thin and extended ſtrata, which likewiſe occupy a part of the globe. There is therefore, in the ſea, a never-ceaſing cauſe of the decompoſition of water: numberleſs agents continually ſeparate its principles, and are themſelves changed. Immenſe maſſes of chalk, depoſited on its bottom, abſorb and fix the water, or convert into a ſolid ſubſtance, part of the liquid which fills its vaſt baſons.

From theſe conſiderations reſpecting the decompoſition of animal ſubſtances in the earth, in the air, and in the water, united to all the data afforded by chemiſtry, it follows, that the external ſtrata of the globe are no longer what they were at the moment of its formation; that it increaſes in ſolidity and extent by the ſucceſſive and uninterrupted augmentation of theſe depoſitions; that the ſoil we inhabit is modern and factitious; that it does not belong to minerals; that this ſuperficial ſoil is owing to the ſlow decompoſition of animals and vegetables; that water is continually diminiſhed in quantity, and changes its form; that one part being decompoſed, furniſhes one of the baſes of the bodies of vegetables

getables and animals; that another part is rendered ſolid in the calcareous ſtrata added to the globe; that the atmoſphere muſt have been modified by all theſe ſucceſſive changes; that vegetables continually influence the atmoſpheric air; and that the ſolar light is greatly concerned in all theſe mutual decompoſitions. Though it ſeems impoſſible to determine the times which have ſucceſſively beheld the decompoſition of water, vegetation, fermentations, putrefaction, the formation of ſaline ſubſtances, bitumens, calcareous matters, and the modifications of the atmoſphere; yet philoſophy and chemiſtry, enriched by modern diſcoveries, ſhew us at leaſt that theſe phenomena have taken place at different epochas; that they continue to modify the actual ſtate of the planet we inhabit; and that if matter be one and the ſame thing, with reſpect to its maſs and intimate nature, as great philoſophers have thought, yet its form being continually varied by the combinations it experiences, muſt gradually produce great revolutions, of which modern chemiſtry alone can appreciate the cauſe, and of which perhaps it may ſome day foretel the final effects.

Here ends the fourth Volume.

SUPPLEMENT
TO THE
ELEMENTS
OF
NATURAL HISTORY
AND
CHEMISTRY.

ALTERATIONS AND ADDITIONS CONTAINED IN VOL. V. OF THE NEW EDITION.

THIS volume commences with the natural hiſtory of animals, contained in the ſubſtance of the eight firſt chapters of Part IV. beginning page 222 of the fourth volume. The few alterations which the Author has made in this Part are noted at page 232 of this Supplement.

The Author then proceeds to inſert the ſupplement to the mineral kingdom, which contains the method of analyſing mineral waters. This is transferred from page 443, of vol. III. with the following alterations.

P. 471, l. 1.

Read, "If it occaſion a precipitate, the mineral water contains aluminous or magneſian ſalts, or martial vitriol, which is conſtantly known by the colour of the precipitate: moſt commonly this precipitate is formed by chalk, which was diſſolved in water by means of the carbonic acid. The ammoniac, or volatile alkali, abſorbs this acid, and the chalk is depoſited.

P. 474, l. 15.

Read, "This artificial hepatic water, which differs from natural ſulphureous waters in being more loaded, and conſequently more ſpeedily decompoſed, affords a precipitate," &c. as in line 20.

—— laſt line of the page.

Inſtead of, "but it did not produce," &c. read, "a very ſmall quantity muſt be uſed, otherwiſe the exceſs burns, and reduces the ſulphur to the ſtate of ſulphuric acid, as I have obſerved in the water of Enghien. The ſulphureous acid precipitates the ſulphur with great facility from waters which contain it."

P. 475, l. 7.

Eraſe the words "prepared with bullock's blood."

P. 476.

The lime water mentioned by the Author in this and the following page, is admitted by him to contain a ſmall portion of Pruſſian blue.

P. 478, l. 12 (from the bottom).

Read, "We have already obſerved, that the aſtringent principle is a peculiar acid, ſince it unites with alkalis," &c. and proceed as in the laſt line of the page.

P. 480, l. 5 (from the bottom).

Eraſe the ſentence beginning with the words "Lime and magneſia," and ending at the word "appearance."

The next article in the preſent volume is entitled,

A Diſcourſe concerning the Principles of modern Chemiſtry, conſidered in a collective View.

This Diſcourſe conſiſts for the moſt part of the matter of the Preliminary Diſcourſe, prefixed to the firſt volume of this work. We ſhall, therefore, proceed to note the alterations, by referring back to the commencement of the firſt volume.

Inſtead of the firſt nine pages of the Preliminary Diſcourſe (part of which, namely, from page xxvii to xxxi, is transferred to page 149 of the firſt volume, as noted in page 22 of this Supplement), the Author has prefixed the following matter:

" By following the progreſs which chemiſtry has not ceaſed to make during the laſt twenty years, we ſoon perceive that the theory of Stahl, ſhaken by the diſcovery of various elaſtic fluids and their properties, has for ſome time left the minds of chemiſts in ſuſpenſe, and has given birth to theories almoſt as different from each other, as there are men ſeriouſly employed in this ſcience. Among theſe philoſophers, there is a conſiderable number, eſpecially in the North, who have not joined any party, but continue to connect the theory of phlogiſton with the newly diſcovered facts. But thoſe who are acquainted with the whole of the ſcience, will eaſily perceive, that this connection is not at all ſatisfactory, and that it requires forced applications, the inconſiſtence of which is ſoon perceived.

The doctrine adopted by ſeveral French chemiſts, at the head of whom we muſt place Mr. Lavoiſier, who firſt laid the foundation and formed an idea of the whole together, is not ſubject to the ſame difficulties. Its ſimplicity, its methodical proceeding, its perſpicuity, and the facility with which it explains all the phenomena of chemiſtry, place it far above all thoſe which at preſent divide the European philoſophers who have not adopted it. This doctrine has been expoſed at large in all the parts of this elementary work. But as it may be of advantage to exhibit a ſhort and condenſed view of the ſubject, I thought that, by uniting in a diſcourſe of no great length the principles upon which it is founded, it would become more ſtriking and clear to thoſe who devote themſelves to the ſtudy of this ſcience; and that this diſcourſe would be ſo much the more uſeful to them, as it exhibits a recapitulation of the great phenomena to which all the reſt may be referred, as to general heads.

There is not a ſingle experiment in chemiſtry in which one or the other of the two following phenomena does not happen. 1. Heat is diſengaged or fixed. 2. An elaſtic fluid is formed, or abſorbed. Theſe two general facts being once eſtabliſhed and clearly known, it will be ſeen, that the foundation of chemical theory depends on the properties and the action of heat, the formation and fixation of elaſtic fluids. It is, therefore, upon theſe two objects that our whole attention ought to be fixed.

Concerning Heat, the Formation and Fixation of elaſtic Fluids.

ALTHOUGH the weight which has been hitherto undetermined of ſenſible heat, or of the combined or latent heat which we call caloric, cannot prove its material or particular exiſtence, yet all the phenomena of chemiſtry unite in favour of the opinion, that it is a being or body ſelf-exiſtent, poſſeſſing conſtant properties or characters, and obeying invariable attractions in ſimilar circumſtances. Beſides the ſenſation common to all men, which heat cauſes our organs to experience, philoſophers have diſcovered diſtinctive properties which belong only to this being. Such is the rarefaction or ſeparation of the particles which heat produces in all natural bodies; and which, by augmenting their volume, diminiſhes their attraction to each other, while it diminiſhes their ſpecific gravity without adding to their maſs, and increaſes their attraction for the particles of other bodies. The more caloric is accumulated in bodies, the more it is compreſſed or condenſed, the more its particular attraction for theſe bodies increaſes, and the more their properties are changed. Fuſion or liquefaction, volatilization or ſublimation, the tranſition of liquids to the form of vapours or elaſtic fluids, are the conſtant effects of the penetration, or rather the combination, of heat. Solid or frozen water, by abſorbing a certain quantity of caloric, becomes liquid or flowing: a greater doſe of this principle renders it inviſible, and gives it the form of air. It cannot be doubted, but that liquid water is a compound of ice, and a determinate doſe of caloric; and that water in vapour or gas is the ſame combination, with a larger proportion of caloric. Such is the general theory of the formation of all elaſtic fluids: they are all compoſed of a baſe more or leſs ſolid and caloric. As this laſt principle follows laws which are peculiar to it in its attractions, it quits one body to unite with another; or rather, the bodies to which caloric is united, having a ſtronger attraction for other bodies than that which they have for caloric, ſuffer this principle to eſcape in order to unite with thoſe other bodies. There is not a ſingle fact in chemiſtry which does not exhibit one or the other of theſe phenomena, relative to the diſengagement or fixation of caloric, or rather to the diſengagement or fixation of elaſtic fluids; and ſometimes both the one and the other of theſe phenomena at once. We ſee, from this ſimple theory, which is nothing elſe but the enunciation of facts, that all elaſtic fluids ought to be diſtinguiſhed by two names; the firſt of which expreſſes their aeriform combination with caloric; ſuch are the generic names of air or gas (the former, when theſe fluids are proper for combuſtion and reſpiration; and the other, when they cannot ſerve that purpoſe); and the ſecond is ſpecific, and denotes the particular baſe of each gas or elaſtic fluid. We ſee, likewiſe, that, in order to preſent a general recapitulation of all the facts of chemiſtry, it is neceſſary to take a review of the elaſtic fluids which are either produced and diſengaged, or fixed and abſorbed in the various phenomena of this ſcience.

All the elaſtic fluids, whoſe properties require to be here attended to, may be divided into four claſſes.

FIRST CLASS.

Here the diviſions proceed as in page xxxii.

P. xxxiii.

The note at the foot of the page is left out.

P. xxxiv, l. 14.

Read, " manifeſtly owing to the ſimultaneous agency of theſe two principles."

P. xxxv, l. 16.

The words " ſo that the matter of fire does not move with great rapidity" are left out.

P. xxxvii, l. 11.

After the word " mercury," inſert the words " ſilver, gold."

—— laſt line but one.

For " never," read, " ſcarcely ever."

P. xliii, l. 20.

The Author has tranſpoſed and altered the following ſections, as follows:

V. " Carbonic acid gas is the firſt elaſtic fluid which was known. Dr. Black, who diſcovered its preſence in chalk and alkalis, has proved, at the ſame time, that the effervefcent property, the mildneſs and cryſtallizability of theſe ſubſtances, was owing to this elaſtic fluid; that when deprived of it, alkaline ſubſtances became acrid, cauſtic, non-effervefcent, &c. This gas exiſts in the air, of which it forms nearly the two hundredth part; in acidulous waters, in certain ſubterraneous cavities, ſuch as the Grotto del Cano, &c. its weight is nearly double that of the air of the atmoſphere; it has a penetrating ſmell, and a ſour taſte; it extinguiſhes bodies in a ſtate of inflammation, kills animals, reddens the tincture of turnſole, precipitates lime-water, renders chalk ſoluble in water, forms, with all alkaline matters, carbonates or a kind of cryſtallizable neutral ſalt, in which the alkaline properties are ſtill perceptible, on account of the weakneſs of the acid. This acid gas, which is greatly concerned in the phenomena of nature and art, is a compound of carbone and oxigene; the firſt in the doſe of twenty-eight parts in the hundred, and the latter ſeventy-two. As carbone appears to be,

of

of all known ſubſtances, that which has the ſtrongeſt poſſible attraction for oxigene, the carbonic acid is one of the compounds the moſt difficultly deſtroyed, and which is moſt frequently produced in chemical analyſes. It is formed in all caſes wherein bodies which contain oxigene are heated with charcoal, as in the reduction of the various metallic oxides or calces, by means of oils, in charcoal itſelf, &c. by the decompoſition of organic matters, which contain charcoal and water, &c.

VI. The ſulphureous acid gas which is obtained, whether by burning ſulphur very ſlowly, or by depriving the ſulphuric acid of part of its oxigene, is a compound of ſulphur and the oxigenous principle, in which this laſt principle is leſs abundant than in the ſulphuric acid: this gas has the acrid and penetrating ſmell of ſulphur, and a very ſour taſte; it extinguiſhes combuſtible ſubſtances which are ignited, and it deſtroys animals; it may be condenſed into a liquid by extreme cold; it reddens and diſcolours moſt vegetable blues; it unites to water and ice, which it melts by virtue of the heat which this gas diſengages during the time of its fixation: it gradually abſorbs the atmoſpheric oxigene, and paſſes to the ſtate of ſulphuric acid.

VII. The fluoric acid gas is diſengaged from the native fluate of lime or vitreous ſpar, by the ſulphuric acid; its taſte and ſmell are very ſtrong; it diſſolves ſiliceous earth, and holds it ſuſpended in the aeriform and inviſible ſtate. The contact of water, by fixing it, ſeparates a portion of this earth; alkali ſeparates it entirely. Its nature is not known; and if this acid, like many other mineral acids, be a compound of a ſimple acidifiable baſe with oxigene, this acidifiable radical muſt have a very ſtrong attraction for oxigene, ſince charcoal does not deprive it of it.

VIII. The muriatic acid gas is nothing but the muriatic acid, diſengaged from water, and melted into an elaſtic fluid by heat. Its ſmell, which is lively and ſuffocating; its taſte, which is very ſtrong; its ſolubility in cold water, which abſorbs it very readily, and ſeparates the heat, which kept it melted; the peculiar neutral ſalts it forms with earthy and alkaline baſes; the white vapour which is perceived when it comes in contact with the water of the atmoſphere; are its characteriſtics. The intimate nature of its compoſition is not known; its acidifiable baſis doubtleſs adheres very ſtrongly to its oxigene, ſince its principles have not yet been ſeparated. We ſhall proceed to ſhew that this acid has even the property of depriving many ſubſtances of the oxigene with which they are ſaturated."

It has already been remarked, page 52 of this Supplement, that the ſection VI. of the Preliminary Diſcourſe, page xlvi, is tranſpoſed, with alteration, to page 12 of Volume II, The ninth ſection proceeds as in page li.

"IX. The muriatic acid gas of Dr. Prieſtley," &c.

P. liii, l. 1.

Read, "ammoniacal copper, and of fulminating gold."

—— l. 3 (from the bottom).

Read, "fifteen parts abſorb eighty-five."

P. lvii, l. 13 (from the bottom).

Inſert, "This phenomenon depends on the hydrogenous gas not requiring ſo elevated a temperature as the ſulphur to take fire by the contact of inflammable bodies in a ſtate of ignition."

—— l. 6 (from the bottom).

Add, "If too large a quantity of theſe acids be uſed, more eſpecially of the oxigenated muriatic acid, they burn the ſulphur of this gas, and convert it into ſulphuric acid; in which caſe no precipitate is afforded. This phenomenon takes place more eſpecially in ſulphureous waters, the precipitation of whoſe ſulphur, by means of acids, requires that they ſhould be uſed with caution."

P. lviii, l. 12.

After the word "decompoſition," add, "by the air, by metallic ſolutions, and the difficulty which was formerly experienced in exhibiting their ſulphur by ſimple acids, and as long as it was not ſuſpected that they exiſted otherwiſe than in the ſtate of a ſulphure or hepar."

P. lviii, l. 3 (from the bottom).

Read, "unleſs they be very thick, and ſmall quantities of the mixture be uſed."

P. lxii, l. 9.

Inſert, "The exiſtence of charcoal diſſolved in this gas is demonſtrated by its weight, and by the reſult of its combuſtion with vital air, which affords carbonic acid; it appears, likewiſe, that the charcoal gives to the hydrogenous gas the fœtid ſmell which every one knows, or at leaſt renders it ſtronger. The charcoal modifies," &c.

P. lxiv.

The Author has reduced the number of heads in this and the following page to 14. Number 9 is omitted; as is likewiſe number 13, and the paragraph numbered 14 is altered to "the various kinds of fermentation." The numbers are accordingly changed.

P. lxvi, l. 6.

Add, "But in order to obtain a more accurate idea, it is neceſſary to add to this mechanical cauſe the chemical attraction, or particular affinity of heat to bodies reſpectively."

P. lxviii, l. 12.

Add, "We may likewiſe take notice, that, as the oxigene is more or leſs ſolid, that is to ſay, more or leſs deprived of heat and light in the compounds, it enters into the bodies which take it up, being ſome of them capable of abſorbing it in a more pure and ſolid ſtate than the former: there will in this caſe be a diſengagement of heat and even of light; this is the reaſon of the exiſtence of theſe two phenomena in the detonations of nitre, in the apparent action of the nitric acid upon ſulphur, charcoal, phoſphorus, moſt of the metals, oils, alcohol, &c."

P. lxxi, l. 7.

Read, " is nearly in the ſame ſtate of uncertainty."

——l. 2 (from the bottom).

After the word " theory," the reſt of the paragraph runs thus: " of which we ſhould then have acquired only half; for the other principles of alkalis would remain abſolutely unknown; and we ſhould be ſtill ignorant more particularly of the difference between the radicals of potaſh and of ſoda, &c."

P. lxxii, l. 16.

After the words " mineral kingdom", read, " as well as the various doſes of hydrogene and carbone, which appear to form the baſe of all the vegetable acids, are ſtill undiſcovered."

P. lxxiii, l. 6.

The paragraph numbered 9 is left out.

P. lxxiv, l. 13 (from the bottom).

Add, "for example, from 15 to 40 parts of oxigene in the hundred parts of iron."

P. lxxv, l. 7 (from the bottom).

Read, "Some of the metals decompoſe only the vitriolic acid, without affecting the water; ſuch are mercury, lead, &c. and theſe metals are not burned, unleſs the vitriolic acid be concentrated: but in the caſe where metals have more force to decompoſe the water than to decompoſe the vitriolic acid, as happens with zinc and iron, theſe metals do not readily become calcined, but," &c. as in line 3, page lxxvi.

P. lxxxi, l. 8 (from the bottom).

The Author has omitted all the matter from hence to line 8, incluſive, on page xci. The ſubject of the vegetable acids having been treated of at the commencement of the fourth volume, as is ſhewn in this Supplement, the Author connects his ſubject by inſerting the following paragraph:

"We begin to acquire a notion of the formation of vegetable principles, during and by the very act of vegetation. We have already announced, in the hiſtory of theſe acids, that they all appear to be formed of analogous baſes; that in the laſt analyſis they all alike afford carbone, hydrogene, and oxigene; and that they ſeem to differ only in the proportion of theſe principles, and their compreſſion or denſity. This opinion becomes more probable, in proportion as experiments on theſe acids are multiplied.

Scheele and Crell have obſerved an analogy between many of them. Scheele, who at firſt thought the acids of ſorrel and ſugar very different from each other, has ſucceeded, as we have elſewhere obſerved, in proving that it is one and the ſame acid: 1. By removing the portion of vegetable alkali which maſks the properties of the oxalic acid, in the acid of ſorrel of commerce, and by reducing it by that means to the ſtate of pure oxalic acid. 2. By changing the acid of ſugar into acid of ſorrel, by the addition of a ſmall quantity of vegetable alkali.

If to this very important fact of vegetable analyſis," and proceed as in line 22, page xcii.

P. xciii, l. 6 (from the bottom).

The words " and conſtitutes ardent ſpirit" are left out.

P. xciv, l. 3 (from the bottom).

Inſtead of the words " that the firſt forms the ſolid parts," read, " that this humour unites by ſimple repoſe into a tiſſue of ſolid fibres."

The remainder of the fifth volume of the new edition conſiſts of the tables of the new Nomenclature, and their explanation, to which we ſhall proceed. The Index, and tables of Natural Hiſtory, are likewiſe tranſpoſed to the end of this volume. Two of theſe being new are ſubjoined to the preſent Supplement.

AN

EXPLANATION

OF THE

TABLE OF NOMENCLATURE*.

WE ſhall firſt obſerve, that our intention in drawing up this Table has not been to offer the whole Nomenclature of Chemiſtry, but to unite, under ſeveral claſſes of compounds, a ſufficient number of ſelect examples, in order that, by means of a ſimple and eaſy ſtudy, our method of naming might be applied to all the compounds which are known to chemiſts, or to thoſe which they may hereafter diſcover. To anſwer this purpoſe, we have divided our table into ſix perpendicular columns, at the head of which are placed the general titles, which announce the ſtate of the bodies whoſe names are found therein.

Each of theſe columns is divided into 55 ſeparate compartments, one beneath the other. This number is determined by that of the

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[*] See Table II. at the end of this Supplement.

ſubſtances not yet decompoſed which we are acquainted with, and which are inſerted in the firſt column. The correſpondent horizontal diviſions of the five following columns, comprehend the principal combinations of theſe ſimple ſubſtances, and muſt therefore be equally numerous in each column.

We ſhall proceed to give an account of the principal circumſtances which offer themſelves in the conſideration of theſe columns.

Column the First.

The firſt column, marked by the Roman numeral I. is entitled, *Subſtances not decompoſed.* We muſt here remark, that theſe bodies are ſimple to us only becauſe we have not yet ſucceeded in analyſing them. All the accurate experiments which have been made for the laſt ten years, ſhew that theſe bodies cannot be ſeparated into ſubſtances of a more ſimple nature, and that they cannot be reproduced by artificial compoſitions. Theſe ſubſtances are, as we have already obſerved, 55 in number. Oppoſite each of theſe is placed, in Arabian characters, the number which denotes the place of each body, and of its correſpondent compounds in the other columns.

The horizontal lines are, therefore, by this diſpoſition, continued abſolutely from the firſt column to the ſixth; and all the horizontal compartments of each column are comprehended and denoted by the ſame number.

The 55 ſimple ſubſtances in the firſt column are divided into five claſſes, according to the comparative nature of each. The firſt diviſion comprehends four bodies, which ſeem to approach neareſt to the idea which has been formed of elements, and which perform the moſt active part in combinations: theſe are, light [1 compartment]; heat [2], hitherto called the matter of heat; oxigene [3], or that part of vital air which is fixed in bodies which burn, which augments their weight, changes their nature, and whoſe character or moſt eminent property being that it forms acids, has induced us to derive its name from this remarkable property: hydrogene [4], or the baſe of the elaſtic fluid called inflammable gas, a ſubſtance which exiſts in the ſolid form in ice, becauſe it is one of the principles of water. Theſe four firſt ſimple ſubſtances are connected by a bracket.

The ſecond claſs of ſubſtances not yet decompoſed in the firſt column comprehends twenty-ſix different bodies, all of which poſſeſs the property of becoming acid by their unions with the oxigene, and which, from this common character, we denote by the words acidifiable baſes. Among theſe twenty-ſix bodies, there are only four which have yet been obtained ſimple and uncombined; theſe are azote, or the nitric radical * [compartment 5], or the ſolid baſe of atmoſpheric mephitis, well known at preſent to chemiſts; pure charcoal, carbone, or the carbonic radical [6]; ſulphur, or the ſulphuric radical [7]; and phoſphorus, or the phoſphoric radical [8]. The twenty-two others are only known in their combinations with oxigene, and in the ſtate of acids; but in order to give a greater degree of perſpicuity and extent to the ſcience, we have ſeparated them from oxigene in idea, and we ſuppoſe them in that ſtate of purity to which it is very probable that art will hereafter ſucceed in reducing them. They are all denominated by the names of their acids, with an uniform termination, which are followed by the generic word radical. Such is the manner in which the expreſſions, muriatic radical [compartment 9], boracic radical [10], fluoric radical [11], ſuccinic radical [12], acetic radical [13], tartaric radical [14], pyrotartaric radical [15], oxalic radical [16], gallic radical [17], citric radical [18], malic radical [19], benzoic radical [20], pyrolignic radical [21], pyromucic radical [22], camphoric radical [23], lactic radical [24], ſaccholactic radical [25],

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* It muſt here be obſerved, likewiſe, that azote has not been obtained alone and inſulated, but combined with caloric, and in the ſtate of gas.

formic

formic radical [26], Pruſſic radical [27], ſebacic radical [28], lithic radical [29], bombic radical [30], are to be underſtood.

The third claſs of the undecompoſed bodies of column I. contains the metallic ſubſtances, which are ſeventeen in number, from the compartment 31 to 47, incluſive. All theſe poſſeſs the names by which they are known at preſent. The three firſt are capable of paſſing to the acid ſtate, and are by this character related to the acidifiable baſes which precede them.

In the fourth claſs of ſubſtances not decompoſed, are placed the earths, ſilex [compartment 48], alumine [49], barytes [50], lime [51], magneſia [52]. Theſe five earths have not yet been decompoſed, and they muſt be conſidered as ſimple ſubſtances, in the preſent ſtate of our knowledge.

Laſtly, the fifth claſs of ſubſtances not decompoſed includes the three alkalis, potaſh [compartment 53], ſoda [54], ammoniac [55]. Although this laſt has been already decompoſed by Bergman and Sheele, and though Mr. Berthollett has preciſely determined the nature and quantity of its principles, we have thought proper to arrange it beneath the fixed alkalis, of whoſe component parts there are hopes we ſhall ſpeedily attain a knowledge; and in order to avoid interrupting the connection of theſe ſubſtances, which in many reſpects

act

act as ſubſtances not decompoſable in the experiments of chemiſtry.

The firſt column, whoſe diviſions have been here ſpoken of, is longitudinally divided into two parts, like all the others; the part on the right hand is appropriated to the ancient names, diſtinguiſhed by the italic character.

COLUMN THE SECOND.

The ſecond column is entitled, *Converted into the State of Gas by Caloric.* It is neceſſary to connect with this title that of the preceding column, and to read, *Subſtances not yet decompoſed, converted into the State of Gas by Caloric.* It will hence be eaſily underſtood, that this ſecond column is deſigned to exhibit the permanent aeriform ſtate which ſeveral of the ſimple ſubſtances, enumerated in the firſt column, are capable of aſſuming. We find in the preſent column, no more than four elaſtic fluids, whoſe names, as well as all the words contained in the other columns, are derived from thoſe of the undecompoſed ſubſtances, and become ſimple and clear by the addition of the word gas, which precedes the former names. Thus we find, in the third compartment, oxigenous gas or vital air; in the fourth, hydrogenous gas; in the fifth, azotic gas; and in the fifty-fifth, ammoniacal gas. The ancient names are inſerted in the adjoining oppoſite column.

Column the Third.

At the head of this column we read the words, *combined with oxigene.* It muſt conſtantly be ſuppoſed that the title of the firſt column is prefixed, and it is then perceived that the *ſubſtances not hitherto decompoſed* are the things ſpoken of. This column is one of the fulleſt, becauſe almoſt every ſubſtance in the firſt column is capable of combining with oxigene. When we caſt our eyes over its diſpoſition, and the names which it exhibits, we ſee immediately that theſe names are all compoſed of two words which expreſs compounds of two ſubſtances; the latter of theſe words is the generic term of acid which indicates the ſaline character given by the oxigene; the former ſpecifies each acid, and is almoſt always that of the radical indicated in the firſt column. The fifth compartment of this third column preſents the union of azote, or the nitric radical, with oxigene, and there reſult three known compounds from this union of two bodies, according to the proportions of their principles. In fact, the azote either contains the leaſt poſſible quantity of oxigene, and then forms the baſe of nitrous gas; or is ſaturated with it, and then conſtitutes the nitric acid; or it contains leſs oxigene than this laſt, but more than nitrous gas, and forms nitrous acid. We ſee that it is ſimply by changing the termination of the ſame word, that we have expreſſed the three ſtates of this combination. It is abſolutely the ſame with regard to the ſulphuric acid [compartment 7], the phoſphoric acid [8], the acetic acid [13]. Each of theſe acids may exiſt in two ſtates of combination with oxigene, according to the quantities which their radicals, or acidifiable baſes, may contain. When their baſes are completely ſaturated, the reſults are the ſulphuric, acetic and phoſphoric acids. When theſe baſes are not ſaturated, and are, as it were, in exceſs with regard to the quantity of oxigene, we name them the ſulphureous, acetous and phoſphoreous acids, as appears in the compartments already referred to. This termination ſerves thus to denote the ſtate of the acids according to the names already employed, of vitriolic and ſulphureous; and we adopt it as a rule equally general and ſimple for all the other acids which are in either of theſe ſtates: it will be eaſy to underſtand, after this, the names of the carbonic acid [compartment 6], the boracic acid [10], and of all thoſe which exhibit only a ſingle ſtate, in which the acidifiable baſe is ſaturated with oxigene. By the ſame law of this Nomenclature we underſtand that the acids which are placed alone in a compartment, and whoſe names terminate in *ous*, contain an exceſs of acidifiable matter; ſuch are the tartareous acid [compartment 14], the pyrotartareous acid [15], the pyroligneous acid [21], and the pyromucous acid [22]. The muriatic acid [compartment 9] is found in a different ſtate from all the others; beſides its acid combination ſaturated with oxigene, it is capable of acquiring an exceſs of this principle, and then obtains ſingular properties: to diſtinguiſh it in this peculiar ſtate, we call it the oxigenated muriatic acid [column 9]; and this firſt ſimple name, whoſe value is well determined, may be hereafter applied to other acids, if they ſhould be diſcovered to poſſeſs the property of becoming ſurcharged with oxigene.

The lower compartments of this third column, from 31 to 47 excluſively, exhibit the nomenclature of another ſyſtem of bodies. We find the word oxide prefixed to the compound denomination; the reaſons have been elſewhere explained, which have engaged us to ſubſtitute this name inſtead of metallic calces. It is eaſy to ſee that, without expreſſing the ſaline quality as the word acid does, this term, nevertheleſs, equally well denotes a combination of oxigene; beſides which, it affords the advantage that it can be employed to denote all bodies capable of uniting with oxigene, and which, in this union, do not form acids, whether becauſe the quantity of oxigene is not ſufficiently abundant, or becauſe their baſes are not of an acidifiable nature. Thus, for example, the phoſphoric acid, vitrified or deprived of a portion of oxigene by the action of a ſtrong heat, is a kind of phoſphoric oxide.

Nitrous gas, which is no more acid than phoſphoric gas, becauſe it does not contain a ſufficient quantity of oxigene, is likewiſe a true nitrous oxide. So likewiſe hydrogene, united to oxigene, does not form an acid; but this union conſtitutes water, which, conſidered under the preſent point of view, may be regarded as an oxide of hydrogene.

Among the ſeventeen metallic oxides, which are exhibited from compartment 31 to 48, there are three which are intermediate between the metallic and acid ſtates. It is for want of oxigene, that the oxides of arſenic [compartment 31], molybdena [32], and tungſten [33], are not yet acids. A greater quantity of this generative principle of acidity forms the arſenic, molybdic and tungſtic acids in the ſame columns. It has been explained how epithets, taken from the colour or the proceſſes, ſerve us to diſtinguiſh the ſeveral oxides of the ſame metal, as may be ſeen at the articles oxides of antimony [compartment 38], oxides of lead [42], and oxides of mercury [44], which afford the moſt numerous examples of this diverſity.

Column the Fourth.

The fourth column, whoſe title is, *Oxigenated and gaſeous*, announces the ſimple ſubſtances, combined at the ſame time with oxigene and a ſufficient quantity of caloric to convert them into the ſtate of permanent gas, at the uſual preſſure and temperature. This exhibits only ſix ſubſtances known to exiſt in this ſtate; namely, nitrous gas, and nitrous acid gas [compartment 5], carbonic acid gas [6], ſulphureous gas [7], muriatic acid and oxigenated muriatic acid gaſes [9], and the fluoric acid gas [11]. As no other of theſe oxigenated ſubſtances have been hitherto placed in the ſtate of gas by caloric, moſt of the compartments of this laſt column are empty: we have availed ourſelves of this circumſtance to inſert peculiar combinations of metallic oxides, or oxigenated metals with various ſubſtances; this column is, therefore, divided in the middle, and takes the new title of *Metallic Oxides, with various Baſes.* The compartments 31, 32, 36, 37, 38, 39, 40, 41, 42, 43, 44, and 45, exhibit combinations of metallic oxides, with ſulphur, and with the alkalis; the former bear the epithet of ſulphurated oxides of arſenic and lead, and the latter that of alkaline metallic oxides: when any of theſe compounds vary in the proportions of the component parts, and conſequently in their properties, we diſtinguiſh them like the ſimple oxides, by ſecond epithets taken from their colour; thus we ſay, the grey, red, orange-coloured, &c. ſulphurated oxides of antimony, compartment 38.

Column the Fifth.

As the 5th column, which comprehends ſimple oxigenated ſubſtances with baſes, or the neutral ſalts in general, offers a greater number of names than the foregoing: it appeared neceſſary to us to exhibit a greater number of examples to ſhew the advantage which this methodical Nomenclature poſſeſſes over the ancient names, moſt of which, though uſed to expreſs ſimilar compoſitions, were themſelves entirely diſſimilar.

A ſlight inſpection of the compartments of this column will ſhew that an uniformity of termination prevails in all the names it contains, the conſtant uſe of which in our Nomenclature is to expreſs analogous compounds. It is eaſy to conceive that this regular proceſs will ſingularly facilitate the ſtudy of the ſcience, and produce the greateſt perſpicuity in chemical works. The ſubſtances inſerted in this 5th column are all compounds of three ſubſtances; acidifiable baſes, the acidifying principle, or oxigene, and earthy alkaline, or metallic baſes: nevertheleſs, their nature is pointed out by two words only; becauſe the firſt, which is derived from that of the oxigenated, or acid combination, includes in itſelf the expreſſion of this union, and the ſecond belongs ſolely to the baſe which ſaturates the acid. All the names of theſe compounds are terminated in *ate*, when they contain the acids in their ſtate of complete ſaturation, by oxigene; their termination is in *ite*, when the acids are deprived of a certain quantity of oxigene. Upon inſpecting the compartments of this column, from the 5th to the 34th, it will be ſeen that we have inſerted a greater number of examples *, in proportion as the acids to which they correſpond, or whoſe ſaline compounds they contain, are more known and uſed: theſe compartments exhibit ſome of the principal differences in the Nomenclature.

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* The neutral ſalts are, at preſent, very numerous; twenty-nine known acids, each of which may be ſaturated by four ſoluble earths, three alkalis, and fourteen metallic oxides, which are not acidifiable (for it appears that the acidifiable oxides, ſuch as thoſe of arſenic, molybdena, and tungſten, cannot neutralize the mineral acids), form 609 ſpecies of compound ſalts. If we add that five of theſe acids, viz. the nitric, the ſulphuric, the muriatic, the acetic, and the phoſphoric, are likewiſe capable of entering into combinations, in their two different ſtates, with neutrallizable baſes, and that ſeveral acids, ſuch as the ſulphuric, tartareous, oxalic, and arſenic acids, are capable of ſaturating various quantities of the baſes, and forming what we call acidules, of which eight very diſtinct ſpecies are already known (ſuch are the acidulous ſulphate of potaſh, or vitriolated tartar with exceſs of acid; the acidulous tartarites, or oxalates of potaſh, of ſoda, of ammoniac, or the creams of tartar, and ſalts of ſorrel, made artificially, with the pure tartareous and oxalic acids, united to a ſmall quantity of alkaline baſes, and the acidulous arſeniate of potaſh, or the neutral arſenical ſalt of Macquer), we ſhall ſee that the number of neutral ſalts may be carried to as far as 722 ſpecies, whoſe denominations may be formed methodically, after the 46 or 48 examples of theſe ſalts, exhibited in the preſent table.

1. The greater number comprehend ſalts whoſe names are terminated in *ate*, as the carbonates [compartment 6], the fluates [11], the ſuccinates [12], the gallates [17], the citrates [18], the malates [19], the benzoates [20], the camphorates [23], the lactates [24], the ſaccholates [25], the formiates [26], the pruſſiates [27], the ſebates [28], the lithiates [29], the bombiates [30], the arſeniates [31], the molybdates [32], the tungſtates [33]. This identical and uniform termination of theſe eighteen genera of neutral ſalts, ſhews that the acids which conſtitute them are not known but in their ſtate of complete ſaturation by the oxigene; theſe acids, therefore, in the third column are all terminated in *ic*, according to the rules of our Nomenclature.

2. In conſidering the compartments 14, 15, 21, and 22, of the 5th column, we find only the tartrites, pyrotartrites, pyrolignites, pyromucites, whoſe uniform termination denotes acids with exceſs of their acidifiable baſes, and that they contain the tartareous, pyrotartareous, pyroligneous, and pyromucous acids.

3. There is, in the ſame column, a third claſs of compartments, in which we find, at the ſame time, neutral ſalts whoſe names have the two terminations here ſpoken of; ſuch are the compartments 5, in which we find nitrates and nitrites; 7, which contains ſulphates and ſulphites; 8, which exhibits phoſphates and

phoſphites; and 13, which includes the acetates and acetites: this double termination in each of the compartments ſufficiently points out, from what we have before explained, that the ſalts to which we have applied them are formed by the ſame acid in two proportions of union with oxigene, always calling to mind that the acids terminating in *ic* form neutral ſalts terminated in *ate*, and that thoſe whoſe termination is in *ous*, conſtitute neutral ſalts terminated in *ite*.

4. In ſeveral compartments of this column we have given examples of different neutral ſalts from thoſe of the two claſſes hitherto diſtinguiſhed. Thus, in compartment 9, we have diſtinguiſhed by the name of oxigenated muriate of potaſh, the combination of the oxigenated muriatic acid with potaſh, a ſalt which is very different from the muriate of potaſh, and in which Mr. Berthollett has diſtinguiſhed the property of detonating on burning coals. We have likewiſe, in other compartments of the ſame column, expreſſed the ſaline combinations in which the acids predominate, by adding to the methodical denominations of theſe ſalts, the epithet acidulous. Thus, in the compartment 14, we read acidulous tartrite of potaſh, and in 16, the acidulous oxalate of potaſh. Laſtly, we have diſtinguiſhed by the expreſſion ſuperſaturated, ſuch ſalts in which the baſe predominates, as may be ſeen in the compartment 8, where we

find ſuperſaturated phoſphate of ſoda; and 10, where we find borax or ſuperſaturated borate of ſoda.

When it is conſidered how rigorous and etymological the method is which we have followed to denominate neutral ſalts, and the very ſmall degree of coincidence among them in the names given to the like ſalts in the ancient nomenclature, it will be ſeen why this column exhibits the greateſt number of variations and changes, though we have really made no other innovation than by adding two varied terminations to the names already known.

COLUMN THE SIXTH.

The 6th and laſt column of this table, which comprehends ſimple ſubſtances combined in their natural ſtate, and without being oxigenated or acidified, as the title ſhews, is one of the ſhorteſt, and contains only a ſmall number of compounds. The lower compartments, from 31 to 48, contain compounds of metals with each other, to which we preſerve the names of alloys and amalgams, which have hitherto been adopted. Above theſe we find only three which exhibit a new nomenclature, founded on the ſame principles as the preceding. Compartment 6 exhibits the expreſſion carbure of iron, which denotes the combination of charcoal in ſubſtance with iron, called plumbago. Compartment 7 exhibits the metallic ſulphures, or the combinations of ſulphur in ſubſtance with the metals; the alkaline ſulphures, or combinations of ſulphur with the alkalis; the ſulphurated hydrogenous gas, or ſolution of ſulphur in hydrogenous gas: and laſtly, in compartment 8, we expreſs by the generical name of metallic phoſphures, the compounds of phoſphorus in ſubſtance with the metals. Thus, inſtead of the word ſiderite, we ſubſtitute the expreſſion phoſphure of iron, which unequivocally denotes the union of phoſphorus with iron. And we find, in theſe three comparable words, carbure, ſulphure, and phoſphure, which differ only in their termination from names which are very well known, a means of conveying an accurate idea of analogous compounds, and of diſtinguiſhing them from all other compounds.

Underneath theſe ſix columns we have placed numerically, the principal compound ſubſtances which conſtitute vegetables. In this part of the table we have choſen out of the ancient names thoſe which by their ſimplicity and clearneſs enter completely into the views we have propoſed.

Such is the method which we have followed in the aſſemblage of names comprehended in this table. After the eaſy ſtudy which the table requires on the part of ſuch as are deſirous of becoming acquainted with our plan, it will ſoon be perceived that we have invented only a very ſmall number of words, if we except thoſe which were indiſpenſably neceſſary to denote ſubſtances before unknown, ſuch as are the newly-diſcovered acids. By following the order of the ſubſtances named in the firſt column, from which all the other names are derived, it will be ſeen that we have no other new words than oxigene, hydrogene, and azote. With regard to the words caloric, carbone, ſilex, and ammoniac, they, as well as their derivatives in the following columns, exhibit only ſlight changes from names already very well known and much uſed. We can, therefore, affirm, that our Nomenclature differs from the ancient almoſt entirely in its terminations only; and that, if from theſe changes there ſhould reſult a greater facility in ſtudy, and greater perſpicuity in expreſſion; if, more eſpecially, they ſhould afford the means of avoiding every equivocal expreſſion, as the trial which has already been made, in the years 1787 and 1788, in the lectures at the Royal Garden and the Lyceum, gives us reaſon to hope, the reformation which we propoſe, founded upon a ſimple method, cannot but be favourable to the progreſs of chemiſtry.

ADVERTISEMENT

RESPECTING THE

TWO SYNONYMA.

WE have thought proper to annex to the general table of the methodical Nomenclature, in which the whole of the ſyſtem which we propoſe is exhibited, a table of Synonyma, at full length, of all the words made uſe of to expreſs chemical preparations. We here preſent theſe Synonyma in the form of two dictionaries. In the firſt, the ancient terms are diſpoſed according to their alphabetic order, and precede the new or adopted names which correſpond with them. By the help of this dictionary it may not only be ſeen what names we have given to different chemical compounds, but likewiſe ſuch perſons as are not familiarized with the greater part of the preparations (as ancient names are very often little calculated to render them known) will find, by attending to the new names, a kind of definition of conſiderable perſpicuity in the words themſelves which compoſe theſe ſynonyma, to enable them eaſily to recollect the compounds ſpoken of.

The ſecond dictionary is the reverſe of the former, and we think it will not be leſs uſeful.

The new denominations are here preſented in the alphabetic order, and are accompanied with all their ancient correſpondent terms. In this table we have endeavoured to reunite the moſt complete ſynonyma, in order to remove thoſe difficulties which beginners meet with in ſeveral other ſciences, and in particular, botany and mineralogy, in which the immenſe quantity of different names given to the ſame thing has produced a degree of confuſion and obſcurity which the labours of the moſt indefatigable men have not yet been ſufficient to clear up.

In this new dictionary we ſhew, that the ſame ſubſtance has often received eight, ten, or twelve different names; that moſt of theſe names have either little or no relation to the things they were applied to; which muſt have neceſſarily happened in a ſcience whoſe firſt authors endeavoured only to cover it with a veil of myſtery, and in the hiſtory of which we may trace different epochas, wherein the learned men who have cultivated it arrived only by inſenſible degrees to the exact knowledge of the compounds. Neverthelefs, to avoid too great prolixity and obſcurity, we have been careful not to bring forward in this place the names formerly given to ſubſtances by the alchemiſts; which, being founded on chimerical or abſurd ideas, have happily been forgotten ſince chemiſtry has aſſociated with natural philoſophy.

Each of theſe ſynonyma will, therefore, have its peculiar uſe. The firſt, which may ſerve as a dictionary to the works of chemiſtry hitherto publiſhed, will exhibit the methodical nomenclature adapted to each ancient word. In this, as well as in the following table, we have connected only the names of ſimple or compound bodies, or chemical preparations, and have brought forward none of thoſe which denote the operations themſelves, becauſe we have made no change in theſe laſt words. The ſecond ſynonymous table is more complete, and contains a greater number of words than the former, becauſe it contains many compounds which are owing to the labours of the moderns; and which, ſome years ago, had no names. This nomenclature may, therefore, be conſidered, in ſome reſpects, as an inventory of our preſent acquiſitions in chemiſtry.

In both tables ſynonymous terms will ſometimes be ſeen among the new names: we preſerve them, either with the view of not loſing ſight of ſome denominations in general uſe, or elſe to leave a choice of ſome expreſſions variouſly terminated, and deſigned to give variety to the expreſſion, and to avoid a monotony, which might perhaps ſeem faſtidious. Such is, for example, the termination of neutral ſalts, which preſents their baſe either in the form of a ſubſtantive or adjective, as the writer chooſes. There will likewiſe be found, in books of chemiſtry, ſome words not mentioned in the ſynonyma, becauſe they have been given to compounds whoſe nature is not yet exactly known; and if the ſtrict proceeding which we have adopted be well attended to, it will be ſeen that we could not give names to combinations which are imperfectly known.

We have added ſome definitions to ſeveral general or particular denominations, either becauſe we had ſome doubts reſpecting the compounds ſpoken of, or becauſe we were treating of bodies newly diſcovered.

The ſecond table, which exhibits the new names in the alphabetical order, and our ancient ſynonyma, contains likewiſe a Latin tranſlation of the new denominations. We have followed the ſame plan for the Latin words. Uniformity of termination, and the laws for the derivatives, have been always the two principles which have guided us in this labour. It would have been incomplete if we had not offered to the learned of all nations the means of expreſſing themſelves in an uniform manner, and of being eaſily underſtood. In proportion as the ſcience ſhall acquire new lights, it will be eaſy to add proper names, according to the method which we have ſufficiently explained in the preceding memoir.

ANCIENT AND NEW SYNONYMA,

IN ALPHABETICAL ORDER.

Ancient Names.	*New Names.*
	A.
ACETOUS ammoniac	Acetite ammoniacal. ——— of ammoniac.
Acetous ſalt of clay	Acetite aluminous. ——— of alumine.
Acetous ſalt of copper	Acetite of copper.
Acetous ſalt of iron	Acetite of iron.
Acetous ſalt of lead	Acetite of lead.
Acetous ſalt of magneſia	Acetite of magneſia.
Acetous ſalt of mercury	Acetite of mercury.
Acetous ſalt of ſoda	Acetite of ſoda.
Acetous ſalt of tartar	Acetite of potaſh.
Acetous ſalt of zinc	Acetite of zinc.
Acid acetous	Acetous acid.
Acid aërial	Carbonic acid.
Acid of alum	Sulphuric acid.
Acid of amber	Succinic acid.
Acid of ants	Formic acid.
Acid of apples	Malic acid.
Acid arſenical	Arſenic acid.
Acid of benzoin	Benzoic acid.
Acid boracic	Boracic acid.
Acid of borax	Boracic acid.
Acid of chalk	Carbonic acid.
Acid of charcoal	Carbonic acid.
Acid cretaceous	Carbonic acid.

Ancient Names.	*New Names.*
Acid of fat	Sebacic acid.
Acid of galls	Gallic acid.
Acid of galls alcoholized	Gallic alcohol.
Acid of lemons	Citric acid.
Acid lignic, or of box	Pyroligneous acid.
Acid maluſian	Malic acid.
Acid marine	Muriatic acid.
Acid marine dephlogiſticated	Oxigenated muriatic acid.
Acid mephitic	Carbonic acid.
Acid of molybdena	Molybdic acid.
Acid of muria	Muriatic acid.
Acid of nitre	Nitric acid.
Acid of nitre pale or colourleſs	Nitric acid.
Acid of nitre deprived of its gas	Nitric acid.
Acid of nitre dephlogiſticated	Nitric acid.
Acid of nitre phlogiſticated	Nitrous acid.
Acid perlate	Superſaturated phoſphate of ſoda.
Acid of phoſphorus dephlogiſticated	Phoſphoric acid.
Acid of phoſphorus phlogiſticated	Phoſphoreous acid.
Acid of ſea-ſalt	Muriatic acid.
Acid of ſilk-worms	Bombic acid.
Acid of ſpar or fluor	Fluoric acid.
Acid of ſugar	Oxalic acid.
Acid of ſulphur	Sulphuric acid.
Acid of tungſtein or tungſten	Tungſtic acid.
Acid of wolfram of Meſſrs. Delhuyar	Tungſtic acid.
Acid ſaccharine	Oxalic acid.
Acid ſaccholactic, or acid of the ſugar of milk	Saccholactic acid.
Acid ſebaceous, or of fat	Sebacic acid.
Acid ſedative, or narcotic, of Homberg	Boracic acid.
Acid ſulphureous	Sulphureous acid.
Acid ſyrupous	Pyromucous acid.
Acid tartareous	Tartareous acid.
Acid vitriolic	Sulphuric acid.
Acid phlogiſticated vitriolic	Sulphureous acid.
Acidum pingue	The hypothetical principle of Meyer.
Affinities	Chemical affinities or attractions.

Aggregation

Ancient Names.	*New Names.*
Aggregation - - -	Aggregation.
Air alkaline - - -	Ammoniacal gas.
Air atmoſpherical, or common air - - -	Atmoſpherical or common air.
Air dephlogiſticated, of Dr. Prieſtley - - -	Oxigenous gas or vital air.
Air, dephlogiſticated marine acid - - - -	Oxigenated muriatic acid gas.
Air factitious - -	Carbonic acid gas.
Air, fœtid, of ſulphur -	Sulphurated hydrogenous gas.
Air, fire, of Scheele - -	Oxigenous gas.
Air, fixed, of Dr. Black -	Carbonic acid gas.
Air impure - -	Azotic gas.
Air inflammable - -	Hydrogenous gas.
Air, marine acid - -	Muriatic acid gas.
Air nitrous - - -	Nitrous gas.
Air phlogiſticated - -	Azotic gas.
Air pure - - -	Oxigenous gas, or vital air.
Air, ſolid, of Hales - -	Carbonic acid gas.
Air vitiated - - -	Azotic gas.
Air vital - - -	Oxigenous gas.
Air, vitriolic acid, of Dr. Prieſtley	Sulphureous acid gas.
Alkaheſt - - - -	The univerſal ſolvent of the alchemiſts.
Alkaheſt of Reſpour - -	Potaſh mixed with oxide of zinc.
Alkaheſt of Van Helmont -	Carbonate of potaſh.
Alkalis in general - -	Alkalis.
Alkalis aërated - -	Alkaline carbonates.
Alkalis cauſtic - - -	Alkalis.
Alkalis effervefcent - -	Alkaline carbonates.
Alkali, fixed, of tartar, cauſtic	Potaſh.
Alkali, fixed, of tartar, not cauſtic	Carbonate of potaſh.
Alkali, fixed vegetable - -	Carbonate of potaſh.
Alkali marine, cauſtic -	Soda.
Alkali marine, not cauſtic -	Carbonate of ſoda.
Alkali mineral acetated -	Acetite of ſoda.
Alkali mineral aërated -	Carbonate of ſoda.
Alkali phlogiſticated -	Ferruginous pruſſiate of potaſh, not ſaturated.
Alkali Pruſſian - -	Ferruginous pruſſiate of potaſh.
Alkali urinous - -	Carbonate of ammoniac. Ammoniacal carbonate.
Alkali vegetable aërated -	Carbonate of potaſh.

Ancient Names.	*New Names.*
Alkali volatile acetated	Ammoniacal acetite. Acetite of ammoniac.
Alkali volatile mild	Ammoniacal carbonate. Carbonate of ammoniac.
Alkali volatile fluor	Ammoniac.
Alkali volatile cauſtic	Ammoniac.
Alkali volatile concrete	Ammoniacal carbonate.
Alkali volatile mephitized	Carbonate of ammoniac.
Allay or alloy of metals	Alloy.
Alum	Sulphate of alumine. Aluminous ſulphate.
Alum marine	Muriate of alumine. Aluminous muriate.
Alum nitrous	Nitrite of alumine. Aluminous nitrite.
Amalgam of biſmuth	Amalgam of biſmuth.
Amalgam of copper	Amalgam of copper.
Amalgam of gold	Amalgam of gold.
Amalgam of lead	Amalgam of lead.
Amalgam of ſilver	Amalgam of ſilver.
Amalgam of tin	Amalgam of tin.
Amalgam of zinc	Amalgam of zinc.
Amber yellow	Amber or ſuccinum.
Antimony crude	Sulphure of antimony.
Antimony diaphoretic	White oxide of antimony by nitre.
Aqua fortis	Nitric acid of commerce.
Aqua regia	Nitro-muriatic acid.
Aqua ſtygia	Nitro-muriatic acid, by the ammoniacal muriate.
Aquila alba	Mild ſublimated mercurial muriate.
Arbor Dianæ	Cryſtallized amalgam of ſilver.
Arcanum corallinum	Red oxide of mercury, by the nitric acid.
Arcanum duplicatum	Sulphate of potaſh.
Argil pure, or argillaceous earth	Alumine.
Argil cretaceous	Aluminous carbonate.
Argil ſparry	Aluminous fluate. Fluate of alumine.
Arſenic, regulus of	Arſenic.
Arſenic, white calx of	Oxide of arſenic.
Arſenic red	Red ſulphurated oxide of arſenic.

Ancient Names.	*New Names.*
Arſeniate of potaſh	Arſeniate of potaſh.
Attractions elective	Elective attractions.
Azure of cobalt, or of the four fires	Vitreous oxide of cobalt and ſilex.

B.

Ancient Names.	*New Names.*
Balſams of Bucquet	Balſams.
Balſam of ſulphur	Sulphure of volatile oil.
Barilla	Carbonate of ſoda.
Barytes	Barytes.
Barytes effervefcent	Carbonate of barytes.
Baſe of vital air	Oxigene.
Baſe of marine ſalt	Soda.
Benzoin or benjamin	Benzoin.
Benzoic ſalts	Benzoates.
Bezoar mineral	Oxide of antimony.
Biſmuth	Biſmuth.
Biſmuth muriated	Muriate of biſmuth.
Bitumen	Bitumen.
Black lead	Carbure of iron.
Blue, Berlin	Pruſſiate of iron.
Blue, Pruſſian	Pruſſiate of iron.
Borax	Borax of ſoda, or borate ſuperſaturated with ſoda.
Borax ammoniacal	Ammoniacal borate.
Borax of zinc	Borate of zinc.
Borax argillaceous	Aluminous borate.
Borax barytic or ponderous	Borate of barytes.
Borax calcareous	Borate of lime. Calcareous borate.
Borax magneſian	Magneſian borate. Borate of magneſia.
Borax martial	Borate of iron.
Borax mercurial	Borate of mercury.
Borax vegetable	Borate of potaſh.
Borax of antimony	Borate of antimony.
Butter of antimony	Sublimated muriate of antimony.
Butter of arſenic	Sublimated muriate of arſenic.
Butter of biſmuth	Sublimated muriate of biſmuth.
Butter of cobalt	Sublimated muriate of cobalt.
Butter of copper	Sublimated muriate of copper.
Butter of tin	Sublimated muriate of tin.

Butter

Ancient Names.	*New Names.*
Butter of tin, ſolid, of Mr. Baumé	Concrete muriate of tin.
Butter of zinc	Sublimated muriate of zinc.
Braſs	Braſs; alloy of copper and zinc.

C.

Calces metallic	Metallic oxides.
Calx of antimony vitrified	Vitreous oxide of antimony.
Cameleon mineral	Oxide of manganeſe and potaſh.
Camphor	Camphor.
Camphoric ſalts	Camphorates.
Cauſticum	Meyer's hypothetical principle.
Cauſticum lunare	Fuſed nitrate of ſilver.
Ceruſe	White oxide of lead by the acetous acid, mixed with carbonate of lime.
Ceruſe of antimony	White oxide of antimony by precipitation.
Chalk	Chalk, carbonate of lime. Calcareous carbonate.
Charcoal pure	Carbone.
Cinnabar	Sulphurated red oxide of mercury.
Clay	Clay; a mixture of alumine and ſilice.
Cobalt	Cobalt.
Colcothar	Red oxide of iron by the ſulphuric acid.
Copper	Copper.
Copper acetated	Acetate of copper.
Copperas green	Sulphate of iron.
Copperas blue	Sulphate of copper.
Copperas white	Sulphate of zinc.
Cream of tartar	Acidulous tartrite of potaſh.

D.

Diamond	Diamond.

E.

Ancient Names.	*New Names.*
Earth, acetated calcareous	Calcareous acetite.
Earth, aërated ponderous	Carbonate of barytes.
Earth animal	Calcareous phoſphate.
Earthy baſe of ponderous ſpar	Barytes.
Earth calcareous	Lime, or calcareous earth.
Earth of alum	Alumine.
Earth animal	Phoſphate of lime.
Earth calcareous	Lime, or calcareous earth.
Earth magneſian	Carbonate of magneſia.
Earth muriatic, of Kirwan	Magneſia.
Earth ponderous	Barytes.
Earth ſiliceous	Siliceous earth, or ſilex.
Emetic tartar	Antimoniated tartrite of potaſh.
Empyreal air	Oxigenous gas.
Eſſences	Volatile oils.
Ether acetous	Acetic ether.
Ether marine	Muriatic ether.
Ether nitrous	Nitric ether.
Ether vitriolic	Sulphuric ether.
Ethiops martial	Black oxide of iron.
Ethiops mineral	Black ſulphurated oxide of mercury.
Ethiops per ſe	Blackiſh mercurial oxide.
Extract	Extract.

F.

Fecula of vegetables	Fecula.
Flowers, ammoniacal cupreous	Sublimated ammoniacal muriate of copper.
Flowers argentine, of regulus of antimony.	Sublimated oxide of antimony.
Flowers metallic	Sublimated metallic oxides.
Flowers of arſenic	Sublimated oxide of arſenic.
Flowers of benzoin	Sublimated benzoic acid.
Flowers of biſmuth	Sublimated oxide of biſmuth.
Flowers of ſulphur	Sublimated ſulphur.
Flowers of tin	Sublimated oxide of tin.
Flowers of zinc	Sublimated oxide of zinc.
Fluids aëriform	Gaſes.
Fluids elaſtic	Gaſes.

Ancient Names.	*New Names.*
Fluor ammoniacal	Fluate of ammoniac. Ammoniacal fluate.
Fluor argillaceous	Aluminous fluate. Fluate of alumine.
Fluor of magneſia	Fluate of magneſia.
Fluor of potaſh	Fluate of potaſh.
Fluor of ſoda	Fluate of ſoda.
Fluor ponderous	Barytic fluate.

G.

Gas	Gas.
Gas, acetous acid	Acetous acid gas.
Gas, aërial muriatic acid	Oxigenated muriatic acid gas.
Gas alkaline	Ammoniacal gas.
Gas, cretaceous acid	Carbonic acid gas.
Gas hepatic	Sulphurated hydrogenous gas.
Gas inflammable	Hydrogenous gas.
Gas, inflammable carbonated	Carbonated hydrogenous gas.
Gas, inflammble of marſhes	Marſh hydrogenous gas (mixture of carbonated hydrogenous gas and azotic gas).
Gas mephitic	Carbonic acid gas.
Gas, marine acid	Muriatic acid gas.
Gas nitrous	Nitrous gas.
Gas phlogiſticated	Azotic gas.
Gas phoſphoric, of Mr. Gengembre	Phoſphorated hydrogenous gas.
Gas of Pruſſian blue	Pruſſic acid gas.
Gas, ſparry acid	Fluoric acid gas.
Gas, ſulphureous	Sulphureous acid gas.
Gas ſylveſtre, of Helmont	Carbonic acid gas.
Gilla vitrioli	Sulphate of zinc.
Glutinous matter of wheat	Gluten.
Gold	Gold.
Gold muriated	Muriate of gold.
Gold fulminating	Ammoniacal oxide of gold.

H.

Hepars	Sulphures.
Heat latent	Caloric.

I.

Ancient Names.	*New Names.*
Ink ſympathetic by cobalt.	Muriate of cobalt.
Iron, or mars.	Iron.
Iron aërated	Carbonate of iron.
Iron acetated	Acetite of iron.
Jupiter	Tin.

K.

Kermes mineral	Red ſulphurated oxide of antimony.

L.

Lapis infernalis	Fuſed nitrate of ſilver.
Lead, or ſaturn	Lead.
Lead muriated	Muriate of lead.
Lead ſparry	Carbonate of lead.
Lead ſubacetated	White oxide of lead by the acetous acid.
Lead ſuperacetated	Acetite of lead.
Lemon-juice	Citric acid.
Ley of ſoap	Solution of ſoda.
Lignic ſalts	Pyro-lignites.
Lilium Paracelſi	Alcohol of potaſh.
Lime-water	Lime-water.
Lime-water, Pruſſian	Pruſſiate of lime.
Liquor, Boyle's fuming	Ammoniacal ſulphur.
Liquor, Silicum	Siliciated potaſh, in ſolution.
Liquor, Libavius's fuming	Fuming muriate of tin.
Liquor ſaturated with the colouring matter of Pruſſian blue.	Pruſſiate of potaſh.
Litharge	Semi-vitreous oxide of lead, or litharge.
Light	Light.
Liver of antimony	Sulphurated oxide of antimony.
Liver of arſenic.	Arſenical oxide of potaſh.
Livers of ſulphur	Alkaline ſulphures.
Livers of ſulphur, earthy	Earthy ſulphures.

Ancient Names.	*New Names.*
Liver of ſulphur, antimoniated	Antimoniated alkaline ſulphure.
Liver of ſulphur, calcareous	Calcareous ſulphure. Sulphure of lime.
Liver of ſulphur, barytic	Barytic ſulphure. Sulphure of barytes.
Liver of ſulphur, magneſian	Sulphure of magneſia. Magneſian ſulphure.
Liver of ſulphur, volatile alkaline	Ammoniacal ſulphure. Sulphure of ammoniac.
Luna cornea	Muriate of ſilver.

M.

Ancient Names.	*New Names.*
Magiſtery of biſmuth	Oxide of biſmuth by the nitric acid.
Magiſtery of lead	Precipitated oxide of lead.
Magiſtery of ſulphur	Precipitated ſulphur.
Magneſia alba	Carbonate of magneſia.
Magneſia aërated, of Bergman	Carbonate of magneſia.
Magneſia black	Black oxide of mangaueſe.
Magneſia cauſtic	Magneſia.
Magneſia cretaceous	Carbonate of magneſia.
Magneſia efferveſcent	Carbonate of magneſia.
Magneſia fluorated	Fluate of magneſia.
Magneſia ſparry	Fluate of magneſia.
Maluſite ſalts	Malites of potaſh, of ſoda, &c.
Manganeſe	Manganeſe.
Maſſicot	Yellow oxide of lead.
Matter of heat	Caloric.
Matter of fire	This term has been uſed to ſignify light, caloric, and phlogiſton.
Matter pearly of Kerkringius	White oxide of antimony by precipitation.
Matter colouring of Pruſſian blue	Pruſſic acid.
Mephitized metals, earths, &c.	Carbonates of metals, &c.
Mephitis atmoſpherical	Azotic gas.
Mercury	Mercury.
Mercury acetated	Acetite of mercury.
Mercurius dulcis	Mild mercurial muriate.

Ancient Names.	*New Names.*
Mercury, white precipitate of	Mercurial muriate by precipitation.
Mercury of metals	Beccher's hypothetical principle.
Minium	Red oxide of lead, or minium.
Molybdena	Molybdena.
Molybdena, ſaline compounds of	Molybdates.
Mother water	Deliqueſcent ſaline reſidue.
Mucilage	Mucus.
Muriated metals	Muriates of different metals.
Muriated gold, or reguline ſalt of gold	Muriate of gold.

N.

Natron, or natrum	Carbonate of ſoda.
Nitre	Nitrate of potaſh, or nitre.
Nitre ammoniacal	Ammoniacal nitrate.
Nitre argillaceous	Nitrate of alumine.
Nitre calcareous	Nitrate of lime. Calcareous nitrate.
Nitre cubic	Nitrate of ſoda.
Nitre fixed	Carbonate of potaſh.
Nitre lunar	Nitrate of ſilver.
Nitre of arſenic	Nitrate of arſenic.
Nitre of biſmuth	Nitrate of biſmuth.
Nitre of cobalt	Nitrate of cobalt.
Nitre of copper	Nitrate of copper.
Nitre of iron	Nitrate of iron.
Nitre of lead	Nitrate of lead.
Nitre of magneſia	Nitrate of magneſia.
Nitre of manganeſe	Nitrate of manganeſe.
Nitre of nickel	Nitrate of nickel.
Nitre of ponderous earth	Barytic nitrate. Nitrate of barytes.
Nitre of ſilver	Nitrate of ſilver.
Nitre of tin	Nitrate of tin.
Nitre of zinc	Nitrate of zinc.
Nitre priſmatic	Nitrate of potaſh.
Nitre quadrangular	Nitrate of ſoda.
Nitre rhomboidal	Nitrate of ſoda.
Nitre ſaturnine	Nitrate of lead.

O.

Ancient Names.	*New Names.*
Ochre	Zellow oxide of iron.
Oil of lime	Calcareous muriate.
Oil of tartar per deliquium	Potaſh in deliqueſcence mixed with carbonate of potaſh.
Oil of vitriol	Sulphuric acid.
Oils ethereal	Volatile oils.
Oils animal	Volatile animal oils.
Oils empyreumatic	Empyreumatic oils.
Oils eſſential	Volatile oils.
Oils by expreſſion	Fixed oils.
Oils fat	Fixed oils.
Oils unctuous	Fixed oils.
Oleum philoſophorum	Fixed empyreumatic oils.
Ore of antimony	Native ſulphure of antimony.
Ore of iron, of marſhes	Iron ore, containing phoſphate of iron.

P.

Pewter	Alloy of copper and tin; pewter.
Phlogiſton	Stahl's hypothetical principle.
Phoſphoric ſal ammoniac	Ammoniacal phoſphate. Phoſphate of ammoniac.
Phoſphoric ſalt of barytes	Phoſphate of barytes. Barytic phoſphate.
Phoſphoric ſalt of magneſia	Magneſian phoſphate.
Phoſphoric ſalt of potaſh	Phoſphate of potaſh.
Phoſphoric ſalt of ſoda	Phoſphate of ſoda.
Phoſphorus of Baldwin	Dry calcareous nitrite.
Phoſphorus of Kunckel	Phoſphorus.
Phoſphorus of Homberg	Dry calcareous muriate.
Platina	Platina.
Plumbago	Carbure of iron.
Pompholix	Sublimated oxide of zinc.
Potaſh	Impure carbonate of potaſh.
Powder of algaroth	Oxide of antimony by the muriatic acid.
Powder of Count de Palma	Carbonate of magneſia.
Powder of Sentinelly	Carbonate of magneſia.

Precipitate,

Ancient Names.	*New Names.*
Precipitate golden, or purple, of Caſſius	Oxide of gold precipitated by tin.
Precipitate red	Red oxide of mercury by the nitric acid.
Precipitate per ſe	Red oxide of mercury by fire.
Precipitate yellow	Yellow oxide of mercury by the ſulphuric acid.
Precipitate white by the muriatic acid	Muriate of mercury by precipitation.
Principle acidifying	Oxigene.
Principle aſtringent	Gallic acid.
Principle inflammable. *See Phlogiſton.*	
Principle mercurial	Beccher's hypothetical principle.
Principle of charcoal	Carbone.
Principle ſorbile of Ludbock	Oxigene.
Pruſſite calcareous	Calcareous pruſſiate. Pruſſiate of lime
Pruſſite of ſoda	Pruſſiate of ſoda.
Pyrites of copper	Sulphure of copper.
Pyrites martial	Sulphure of iron.
Pyrophorus of Homberg	Carbonated ſulphure of alumine. Pyrophorus of Homberg.

R.

Realgar	Red ſulphurated oxide of arſenic.
Realgites, ſalts formed with aqua regia	Nitro-muriates.
Regulus	A word uſed to ſignify the metallic ſtate.
Regulus of antimony	Antimony.
Regulus of arſenic	Arſenic
Regulus of cobalt	Cobalt.
Regulus of manganeſe	Manganeſe.
Regulus of molybdena.	Molybdena.
Regulus of ſyderite	Phoſphure of iron.
Reſins	Reſins.
Ruſt of copper	Green oxide of copper.
Ruſt of iron	Carbonate of iron.
Ruby of antimony	Vitreous brown ſulphurated oxide of antimony.

S.

Ancient Names.	*New Names.*
Saffron of mars	Oxide of iron.
Saffron of mars, aperitive	Carbonate of iron.
Saffron of mars, aſtringent	Brown oxide of iron.
Saffron of metals	Semi-vitreous ſulphurated oxide of antimony.
Sal ammoniac	Ammoniacal muriate. Muriate of ammoniac.
Sal ammoniac fixed	Calcareous muriate. Muriate of lime.
Sal de duobus	Sulphate of potaſh.
Sal polychreſt of Glaſer	Sulphate of potaſh.
Sal polychreſt of Rochelle	Tartrite of ſoda.
Sal ſodæ. *See Soda.*	
Salt acetous ammoniacal	Ammoniacal acetite. Acetite of ammoniac.
Salt acetous calcareous	Calcareous acetite. Acetite of lime.
Salt acetous magneſian	Magneſian acetite. Acetite of magneſia.
Salt acetous martial	Acetite of iron.
Salt acetous mineral	Acetite of ſoda.
Salt acetous argillaceous	Aluminous acetite.
Salt acetous of zinc	Acetite of zinc.
Salt ammoniacal cretaceous	Ammoniacal carbonate.
Salt ammoniacal fixed	Calcareous muriate. Muriate of lime.
Salt ammoniacal nitrous	Nitrate of ammoniac.
Salt ammoniacal (ſecret of Glauber)	Sulphate of ammoniac.
Salt ammoniacal ſedative	Ammoniacal borate.
Salt ammoniacal ſparry	Fluate of ammoniac.
Salt ammoniacal vitriolic	Ammoniacal ſulphate.
Salt bitter purging	Magneſian ſulphate. Sulphate of magneſia.
Salt common	Muriate of ſoda.
Salt febrifuge of Sylvius	Muriate of potaſh.
Salt fuſible of urine	Phoſphate of ſoda and ammoniac.
Salt, Glauber's	Sulphate of ſoda.
Salt marine argillaceous	Aluminous muriate. Muriate of alumine.

Ancient Names.	*New Names.*
Salt marine calcareous	Calcareous muriate. Muriate of lime.
Salt marine magneſian	Magneſian muriate. Muriate of magneſia.
Salt marine of iron	Muriate of iron.
Salt marine of zinc	Muriate of zinc.
Salt native of urine	Phoſphate of ſoda and ammoniac.
Salt, neutral arſenical, of Macquer	Acidulous arſeniate of potaſh.
Salt of alembroth	Ammoniaco-mercurial muriate.
Salt of amber, obtained by cryſtallization	Cryſtallized ſuccinic acid.
Salt of calcothar	Sulphate of iron, in a ſtate little known.
Salt of Epſom	Sulphate of magneſia.
Salt of jupiter	Muriate of tin.
Salt of milk	Sugar of milk.
Salt of Scheidſchutz	Magneſian ſulphate.
Salt of Sedlitz	Sulphate of magneſia.
Salt of Segner	Sebate of potaſh.
Salt of Seignette	Tartrite of ſoda.
Salt of ſorrel.	Acidulous oxalate of potaſh.
Salt of wiſdom	Ammoniaco-mercurial muriate.
Salt of wormwood, common	Carbonate of potaſh.
Salt-petre	Nitrate of potaſh ; or nitre.
Salt reguline of gold	Muriate of gold.
Salt ſedative	Boracic acid.
Salt ſedative mercurial	Borate of mercury.
Salt ſedative ſublimated	Sublimated boracic acid.
Salt ſtanno-nitrous	Nitrate of tin.
Salt ſulphureous, of Stahl	Sulphite of potaſh.
Salt vegetable	Tartrite of potaſh.
Salt volatile of amber	Sublimated ſuccinic acid.
Salt, wonderful pearly.	Superſaturated phoſphate of ſoda.
Saturn	Lead.
Selenite	Sulphate of lime.
Silver	Silver.
Silver muriated	Muriate of ſilver.
Silver ſupernitrated	Fuſed nitrate of ſilver.
Snow of antimony	White ſublimated oxide of antimony.
Soaps acid	Acid ſoaps.

Ancient Names.	*New Names.*
Soaps alkaline	Alkaline ſoaps.
Soaps earthy, of Mr. Berthollett	Earthy ſoaps.
Soaps metallic, of Mr. Berthollett	Metallic ſoaps.
Soap of Starkey	Saponul of potaſh.
Soda cauſtic	Soda.
Soda cretaceous	Carbonate of ſoda.
Spaniſh white	White oxide of lead by the acetous acid.
Spar ammoniacal	Ammoniacal fluate.
Spar calcareous	Carbonate of lime.
Spar fluor	Calcareous fluate.
Spar ponderous	Sulphate of barytes.
Spirits acid	Acids diluted with water.
Spirit acid of wood	Pyroligneous acid.
Spirit alkaline volatile	Ammoniacal gas.
Spirit ardent	Alcohol.
Spirit of Mindererus	Ammoniacal acetite.
Spirit of nitre	Nitric acid diluted with water.
Spirit of nitre dulcified	Nitric alcohol.
Spirit of nitre fuming	Nitrous acid.
Spirit of ſalt	Muriatic acid.
Spirit of ſal ammoniac	Ammoniac.
Spirit of venus	Acetic acid.
Spirit of vitriol	Sulphuric acid diluted with water.
Spirit of wine	Alcohol.
Spiritus rector	Aroma.
Spirit volatile of ſal ammoniac	Ammoniac diluted with water.
Spiritus ſylveſtris, of Helmont	Carbonic acid.
Stone of the bladder	Lithic acid.
Sublimate corroſive	Corroſive muriate of mercury.
Sugar	Sugar.
Sugar candied	Cryſtallized ſugar.
Sugar of lead	Acetite of lead.
Sugar or ſalt of milk	Sugar of milk.
Sulphur	Sulphur.
Sulphur golden of antimony	Orange-coloured ſulphurated oxide of antimony.
Sydérite	Phoſphate of iron.
Syderotete of Mr. de Morveau	Phoſphure of iron.

T.

Ancient Names.	*New Names.*
Tartar	Acidulous tartrite of potaſh.
Tartar ammoniacal	Ammoniacal tartrite.
Tartar antimoniated	Antimoniated tartrite of potaſh.
Tartar calcareous	Tartrite of lime.
Tartar chalybeated.	Ferruginous tartrite of potaſh.
Tartar cretaceous	Carbonate of potaſh.
Tartar crude	Tartar.
Tartar cupreous	Tartrite of copper.
Tartar emetic	Antimoniated tartrite of potaſh.
Tartar of magneſia	Tartrite of magneſia.
Tartar of potaſh	Tartrite of potaſh.
Tartar of ſoda	Tartrite of ſoda.
Tartar martial ſoluble	Ferruginous tartrite of potaſh.
Tartar mephitized	Carbonate of potaſh.
Tartar mercurial	Mercurial tartrite.
Tartar ſaturnine	Tartrite of lead.
Tartar ſparry, or of ſpar	Fluate of potaſh.
Tartar ſoluble	Tartrite of potaſh.
Tartar ſtibiated	Antimoniated tartrite of potaſh.
Tartar tartariſed, or terra foliata tartari	Tartrite of potaſh.
Tartar tartariſed, holding antimony in ſolution	Tartrite of potaſh ſupercompounded with antimony.
Tartar vitriolated.	Sulphate of potaſh.
Tincture acrid of tartar	Alcohol of potaſh.
Tinctures ſpirituous	Reſinous alcohols.
Tin	Tin.
Tin muriated	Muriate of tin.
Tungſtein	Tunſtein, or Tungſtein
Turbith mineral	Yellow oxide of mercury by the ſulphuric acid.
Turbith nitrous	Yellow oxide of mercury by the nitric acid.

V.

Verdegris	Green oxide of copper.
Verdegris of the ſhops	Acetite of copper, with exceſs of oxide.
——— diſtilled	Cryſtalliſed acetite of copper.
Venus	Copper.

Ancient Names.	*New Names.*
Vinegar diſtilled	Acetous acid.
Vinegar of ſaturn	Acetite of lead.
Vinegar radical	Acetic acid.
Vitriol ammoniacal	Ammoniacal ſulphate.
Vitriol blue, or Roman vitriol	Sulphate of copper.
Vitriol green, or copperas	Sulphate of iron.
Vitriol magneſian	Sulphate of magneſia.
Vitriol martial	Sulphate of iron.
Vitriol of antimony	Sulphate of antimony.
Vitriol of clay, or argile	Sulphate of alumine.
Vitriol of biſmuth	Sulphate of biſmuth.
Vitriol of cobalt	Sulphate of cobalt.
Vitriol of copper	Sulphate of copper.
Vitriol of cyprus	Sulphate of copper.
Vitriol of lead	Sulphate of lead.
Vitriol of manganeſe	Sulphate of manganeſe.
Vitriol of mercury	Sulphate of mercury.
Vitriol of nickel	Sulphate of nickel.
Vitriol of platina	Sulphate of platina.
Vitriol of potaſh	Sulphate of potaſh.
Vitriol of ſilver	Sulphate of ſilver.
Vitriol of ſoda	Sulphate of ſoda.
Vitriol of tin	Sulphate of tin.
Vitriol of zinc	Sulphate of zinc;
Vitriol white	Sulphate of zinc.

W.

Water	Water.
Waters aërated, or acidulated	Water impregnated with carbonic acid.
Water mercurial	Solution of nitrate of mercury.
——— hepatic	Sulphurated or ſulphureous waters.
Wolfram of Meſſ. d'Elhuyar	Tunſtein.
Wool philoſophical	Sublimed oxide of zinc.

Z.

Zinc	Zinc.

A
DICTIONARY
OF THE
NEW CHEMICAL NOMENCLATURE.

A.

New Names.	Ancient Names.
ACETATES, Acetas, tis, ſ. m.	Salts formed by the union of the acetic acid, or radical vinegar, with different baſes.
Acetate aluminous, or Acetate of alumine. Acetas aluminoſus.	
Acetate ammoniacal, or Acetate of ammoniac *. Acetas ammoniacalis.	
Acetate of arſenic, Acetas arſenici.	
Acetate of barytes, Acetas barytæ.	

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* We ſhall not again repeat theſe two manners of expreſſing the baſis of a neutral ſalt, but ſhall uſe the one or the other without diſtinction. Theſe firſt examples are ſufficient to ſhew, that either the ſubſtantive or the adjective may be uſed at pleaſure.

This obſervation applies equally to the Latin nomenclature.

New Names.	*Ancient Names.*
Acetate of biſmuth, Acetas biſmuthi.	
Acetate of cobalt, Acetas cobalti.	
Acetate of copper, Acetas cupri.	
Acetate of gold, Acetas auri.	
Acetate of iron, Acetas ferri.	
Acetate of lead, Acetas plumbi.	
Acetate of lime, Acetas calcareus.	
Acetate of magneſia, Acetas magneſiæ.	
Acetate of manganeſe, Acetas magneſii.	
Acetate of mercury, Acetas hydrargiri.	
Acetate of molybdena, Acetas molybdeni.	
Acetate of nickel, Acetas niccoli.	
Acetate of platina, Acetas platini.	
Acetate of potaſh, Acetas potaſſæ.	
Acetate of ſilver, Acetas argenti.	
Acetate of ſoda, Acetas ſodæ.	
Acetate of tin, Acetas ſtanni.	
Acetate of tunſtein, Acetas tunſteni.	
Acetate of zinc, Acetas zinci.	
Acetites, Acetis, itis, ſ. m.	Salts formed by the union of the acetous acid, or diſtilled vinegar, with different baſes.
Acetite aluminous, Acetis aluminoſus.	Acetated clay.

Acetite

New Names.	*Ancient Names.*
Acetite ammoniacal, Acetis ammoniacalis.	Ammoniacal acetous ſalt. Spirit of Mindererus.
Acetite of antimony, Acetis ſtibii.	
Acetite of arſenic, Acetis arſenicalis.	The fuming arſenico-acetous liquor of Mr. Cadet.
Acetite of barytes, Acetis baryticus.	
Acetite of biſmuth, Acetis biſmuthi.	
Acetite of cobalt, Acetis cobalti.	
Acetite of copper, Acetis cupri.	Acetous ſalt of copper, verdegris. Cryſtals of venus, or diſtilled verdegris.
Acetite of gold, Acetis auri.	
Acetite of iron, Acetis ferri.	Martial acetous ſalt.
Acetite of lead, Acetis plumbi.	Acetous ſalt of lead. Vinegar of ſaturn. Salt or ſugar of lead.
Acetite of lime, Acetis calcareus.	Acetous calcareous ſalt.
Acetite of magneſia, Acetis magneſiæ.	Acetous ſalt of magneſia.
Acetite of manganeſe, Acetis magneſii.	
Acetite of mercury, Acetis hydrargiri.	Mercurial terra foliata.
Acetite of molybdena, Acetis molybdeni.	
Acetite of nickel Acetis niccoli.	
Acetite of platina, Acetis platini.	
Acetite of potaſh, Acetis potaſſæ, vel potaſſeus.	Terra foliata tartari.
Acetite of ſilver, Acetis argenti.	
Acetite of ſoda, Acetis ſodæ, vel ſodaceus.	Acetous mineral ſalts. Mineral terra foliata.

Acetite

New Names.	*Ancient Names.*
Acetite of tin, Acetis ſtanni.	
Acetite of tunſtein, Acetis tunſteni.	
Acetite of zinc, Acetis zinci.	Acetous ſalt of zinc.
Acid acetic, Acidum aceticum.	Radical vinegar. Spirit of venus.
Acid acetous, Acidum acetoſum.	Acetous acid. Diſtilled vinegar.
Acid arſenic, Acidum arſenicum.	Arſenical acid.
Acid benzoic, Acidum benzoicum.	Acid of benjamin or benzoin.
Acid benzoic ſublimed, Acidum benzoicum ſublimatum.	Flowers of benzoin. Volatile ſalt of benzoin.
Acid bombic, Acidum bombicum.	Acid of ſilk-worms.
Acid boracic, Acidum boracicum.	Volatile narcotic ſalt of vitriol. Sedative ſalt, acid of borax.
Acid carbonic, Acidum carbonicum.	Gas ſylveſtre, of Van Helmont. Spiritus ſylveſtris. Fixed air, of Dr. Black. Aerial acid. Atmoſpheric acid. Mephitic acid. Cretaceous acid. Acid of charcoal.
Acid citric, Acidum citricum.	Lemon juice.
Acid fluoric, Acidum fluoricum.	Fluoric acid. Acid of ſpar.
Acid formic, Acidum formicum.	Formic acid, acid of ants.
Acid gallic, Acidum gallæ, ſeu gallaceum.	Aſtringent principle. Gallic acid.
Acid lactic, Acidum lacticum.	Sour milk, galactic acid.
Acid lithic, Acidum lithicum.	Acid of bezoar. Lithiaſic acid.
Acid malic, Acidum malicum.	Acid of apples. Maluſian acid.

Acid

New Names.	*Ancient Names.*
Acid molybdic, Acidum molybdicum.	Acid of molybdena. Acid of wolfram.
Acid muriatic, Acidum muriaticum.	Fuming ſpirit of ſalt. Marine acid.
Acid muriatic oxigenated, Acidum muriaticum oxigenatum.	Dephlogiſticated marine acid. Aerated marine acid.
Acid nitrous, Acidum nitroſum.	Phlogiſticated nitrous acid. Fuming nitrous acid. Fuming ſpirit of nitre.
Acid nitric, Acidum nitricum.	Pale nitrous acid. Dephlogiſticated nitrous acid.
Acid nitro-muriatic, Acidum nitro-muriaticum.	Aqua regia. Regaline acid.
Acid oxalic, Acidum oxalicum.	Acid of ſorrel. Saccharine acid. Acid of ſugar.
Acid phoſphoreous, Acidum phoſphoroſum.	Volatile phoſphoric acid.
Acid phoſphoric, Acidum phoſphoricum.	Acid of phoſphorus. Acid of urine.
Acid Pruſſic, Acidum Pruſſicum.	Colouring matter of Pruſſian blue.
Acid pyroligneous, Acidum pyrolignoſum.	Empyreumatic acid, ſpirit of wood.
Acid pyromucous, Acidum pyromucoſum.	Spirit of honey, of ſugar, &c. Syrupous acid.
Acid pyrotartareous, Acidum pyrotartaroſum.	Spirit of tartar.
Acid ſaccholactic. Acidum ſaccholacticum.	Acid of the ſugar of milk.
Acid ſebacic, Acidum ſebacicum.	Acid of fat.
Acid ſuccinic, Acidum ſuccinicum.	Volatile ſalt of amber. Acid of amber.
Acid ſulphureous, Acidum ſulphuroſum.	Sulphureous acid. Volatile ſulphureous acid. Phlogiſticated vitriolic acid. Spirit of ſulphur.
Acid ſulphuric, Acidum ſulphuricum.	Acid of ſulphur. Vitriolic acid. Oil of vitriol. Spirit of vitriol.

New Names.	*Ancient Names.*
Acid tartareous, Acidum tartaroſum.	Tartareous acid. Acid of tartar.
Acid tunſtic, Acidum tunſticum.	Acid of tungſtein, Acid of wolfram.
Affinity. Affinitas.	Affinity.
Aggregation. Aggregatio.	Aggregation.
Air atmoſpherical. Aër atmoſphæricus.	Atmoſpherical air.
Alkalis, Alkalia.	Alkalis in general.
Alcohol, Alcohol, indecl.	Spirit of wine. Ardent ſpirits.
Alcohol of potaſh, Alcohol potaſſæ.	Lily of Paracelſus, Acrid tincture of tartar.
Alcohol nitric, Alcohol nitricum.	Dulcified ſpirit of nitre.
Alcohol reſinous, Alcohol reſinoſum.	Spirituous tincture.
Alloy or allay, Connubium metallicum	Alloy of metals.
Alumine, Alumina.	Earth of alum. Baſis of alum. Pure argillaceous earth.
Amalgam.	Amalgam.
Ammoniac, Ammoniaca.	Volatile alkali cauſtic. Fluor volatile alkali. Volatile ſpirit of ſalammoniac.
Antimony, Antimonium, ſtibium.	Regulus of antimony.
Argile, or clay, a mixture of alumine and ſilice, Argilla.	Clay.
Aroma, Aroma.	Spiritus rector. Odoriferous principle of flowers.
Arſeniate, Arſenias, tis, ſ. m.	Arſenical ſalts.
Arſeniate acidulous of potaſh, Arſenias acidulus potaſſæ.	Arſenical neutral ſalt of Macquer.
Arſeniate of alumine, Arſenias aluminæ.	
Arſeniate of ammoniac, Arſenias ammoniacæ ſeu ammoniacalis.	Arſenical ammoniac.

Arſeniate

New Names.	*Ancient Names.*
Arſeniate of barytes, Arſenias barytæ.	
Arſeniate of biſmuth, Arſenias biſmuthi.	
Arſeniate of cobalt, Arſenias cobalti.	
Arſeniate of copper, Arſenias cupri.	
Arſeniate of gold, Arſenias auri.	
Arſeniate of iron, Arſenias ferri.	
Arſeniate of lime, Arſenias calcis.	
Arſeniate of magneſia, Arſenias magneſiæ.	
Arſeniate of mangaeſe, Arſenias magneſii.	
Arſeniate of mercury, Arſenias hydrargiri.	
Arſeniate of molybdena, Arſenias molybdeni.	
Arſeniate of nickel, Arſenias niccoli.	
Arſeniate of platina, Arſenias platini.	
Arſeniate of potaſh, Arſenias potaſſæ.	
Arſeniate of ſilver, Arſenias argenti.	
Arſeniate of ſoda, Arſenias ſodæ.	
Arſeniate of tin, Arſenias ſtanni.	
Arſeniate of tunſtein, Arſenias tunſteni.	
Arſeniate of zinc, Arſenias zinci.	
Azote.	Baſe of atmoſpherical mephitis.
	B.
Barytes, Baryta.	Ponderous earth. Barytes. Baſis of ponderous ſpar.

Balſams,

New Names.	*Ancient Names.*
Balſams, Balſama.	Balſams of Bucquet (reſins united with a concrete acid ſalt).
Benzoin, Benzoe.	Benzoin or benjamin.
Benzoates, Benzoas, tis, ſ. m.	Salts formed by the union of the benzoic acid with different baſes. The ſalts of this genus have no appellations in the ancient nomenclature.
Benzoate of alumine, Benzoas aluminoſus.	
Benzoate of ammoniac, Benzoas ammoniacalis.	
Benzoate of antimony, Benzoas ſtibii.	
Benzoate of arſenic, Benzoas arſenicalis.	
Benzoate of barytes, Benzoas baryticus.	
Benzoate of biſmuth, Benzoas biſmuthi.	
Benzoate of cobalt, Benzoas cobalti.	
Benzoate of copper, Benzoas cupri.	
Benzoate of gold, Benzoas auri.	
Benzoate of iron, Benzoas ferri.	
Benzoate of lead, Benzoas plumbi.	
Benzoate of lime, Benzoas calcareus.	
Benzoate of magneſia, Benzoas magneſiæ.	
Benzoate of manganeſe, Benzoas magneſii.	
Benzoate of mercury, Benzoas hydrargiri.	
Benzoate of molybdena, Benzoas molybdeni.	

New Names.	*Ancient Names.*
Benzoate of nickel, Benzoas niccoli.	
Benzoate of platina, Benzoas platini.	
Benzoate of potaſh, Benzoas potaſſæ.	
Benzoate of ſilver, Benzoas argenti.	
Benzoate of ſoda, Benzoas ſodæ.	
Benzoate of tin, Benzoas ſtanni.	
Benzoate of tunſtein, Benzoas tunſteni.	
Benzoate of zinc, Benzoas zinci.	
Biſmuth Biſmuthum.	Biſmuth.
Bitumens, Bitumina.	Bitumens.
Bombiate, Bombias, tis, ſ. m.	Salt formed by the union of the bombic acid with different baſes. This genus of ſalts had no appellation in the ancient nomenclature.
Bombiate of alumine, Bombias aluminoſus.	
Bombiate of ammoniac, Bombias ammoniacalis.	
Bombiate of antimony, Bombias ſtibii.	
Bombiate of arſenic, Bombias arſenicalis.	
Bombiate of barytes, Bombias baryticus.	
Bombiate of biſmuth, Bombias biſmuthi.	
Bombiate of cobalt, Bombias cobalti.	
Bombiate of copper, Bombias cupri.	
Bombiate of gold, Bombias auri.	

New Names.	*Ancient Names.*
Bombiate of lead, Bombias plumbi.	
Bombiate of iron, Bombias ferri.	
Bombiate of lime, Bombias calcareus.	
Bombiate of magneſia, Bombias magneſiæ.	
Bombiate of manganeſe. Bombias magneſii.	
Bombiate of mercury, Bombias hydrargiri.	
Bombiate of molybdena, Bombias molybdeni.	
Bombiate of nickel, Bombias niccoli.	
Bombiate of platina, Bombias platini.	
Bombiate of potaſh, Bombias potaſſæ.	
Bombiate of ſilver, Bombias argenti.	
Bombiate of ſoda, Bombias ſodæ.	
Bombiate of tin, Bombias ſtanni.	
Bombiate of tunſtein, Bombias tunſteni.	
Bombiate of zinc. Bombias zinci.	
Borate, Boras, tis, ſ. m.	Borax.
Borate aluminous, Boras aluminoſus.	Argillaceous borax.
Borate ammoniacal, Boras ammoniacalis.	Ammoniacal borax. Sedative ſal ammoniac.
Borate of antimony, Boras ſtibii.	Borax of antimony.
Borate of arſenic, Boras arſenici.	
Borate of barytes, Boras barytæ.	Ponderous or barytic borax.
Borate of biſmuth, Boras biſmuthi.	

New Names.	*Ancient Names.*
Borate of cobalt, Boras cobalti.	Borax of cobalt.
Borate of copper, Boras cupri.	Borax of copper.
Borate of gold, Boras auri.	
Borate of iron, Boras ferri.	Borax of iron.
Borate of lead, Boras plumbi.	
Borate of lime, Boras calcis.	
Borate of magneſia, Boras magneſiæ.	Magneſian borax.
Borate of manganeſe. Boras magneſii.	
Borate of mercury, Boras mercurii.	Mercurial borax. Mercurial ſedative ſalt.
Borate of molybdena. Boras molybdeni.	
Borate of nickel. Boras niccoli.	
Borate of platina. Boras platini.	
Borate of potaſh, Boras potaſſæ.	Vegetable borax.
Borate of ſilver, Boras argenti.	
Borate of ſoda, Boras ſodæ.	Common borax ſaturated with the acid of borax.
Borate of tin, Boras ſtanni.	
Borate of tunſtein, Boras tunſteni.	
Borate of zinc, Boras zinci.	Borax of zinc.
Borax of ſoda, or borate ſuperſaturated with ſoda.	Crude borax, Tincal. Chryſocalla. Borax of commerce.

C.

New Names.	*Ancient Names.*
Caloric, Caloricum.	Latent heat. Fixed heat. Matter of heat.
Camphor, Camphora.	Camphor.
Camphorate, Camphoras, tis, ſ. m.	Salt formed by the union of the camphoric acid with different baſes. Theſe ſalts were unknown to former chemiſts, and have no names in the ancient nomenclature.
Camphorate of alumine, Camphoras aluminoſus.	
Camphorate of ammoniac, Camphoras ammoniacalis.	
Camphorate of antimony, Camphoras ſtibii.	
Camphorate of arſenic, Camphoras arſenicalis.	
Camphorate of barytes, Camphoras baryticus.	
Camphorate of biſmuth, Camphoras biſmuthi.	
Camphorate of cobalt, Camphoras cobalti.	
Camphorate of copper, Camphoras cupri.	
Camphorate of gold, Camphoras auri.	
Camphorate of iron, Camphoras ferri.	
Camphorate of lead, Camphoras plumbi.	
Camphorate of lime, Camphoras calcis.	
Camphorate of magneſia, Camphoras magneſiæ.	
Camphorate of manganeſe, Camphoras magneſii.	
Camphorate of mercury, Camphoras hydrargiri.	

New Names.	*Ancient Names.*
Camphorate of molybdena, Camphoras molybdeni.	
Camphorate of nickel, Camphoras niccoli.	
Camphorate of platina, Camphoras platini.	
Camphorate of potaſh, Camphoras potaſſæ.	
Camphorate of ſilver, Camphoras argenti.	
Camphorate of ſoda, Camphoras ſodæ.	
Camphorate of tin, Camphoras ſtanni.	
Camphorate of tunſtein, Camphoras tunſteni.	
Camphorate of zinc, Camphoras zinci.	
Carbone, Carbonicum.	Pure charcoal.
Carbonate, Carbonas, tis. ſ. m.	Salt formed by the union of the carbonic acid with baſes.
Carbonate of alumine, Carbonas aluminoſus.	
Carbonate of ammoniac, Carbonas ammoniaci.	Concrete volatile alkali. Ammoniacal chalk.
Carbonate of antimony, Carbonas antimonii.	
Carbonate of arſenic, Carbonas arſenicalis.	
Carbonate of barytes, Carbonas baryticus.	Barytic or ponderous chalk. Aerated ponderous earth. Efferveſcent barytes. Mephitized barytes.
Carbonate of biſmuth, Carbonas biſmuthi.	
Carbonate of cobalt, Carbonas cobalti.	
Carbonate of copper, Carbonas cupri.	
Carbonate of gold, Carbonas auri.	

New Names.	*Ancient Names.*
Carbonate of iron, Carbonas ferri.	Aperitive ſaffron of mars. Ruſt of iron. Aerated iron. Martial chalk. Mephitized iron.
Carbonate of lead, Carbonas plumbi.	Chalk of lead. Spathoſe lead ore.
Carbonate of lime, Carbonas calcis.	Chalk. Limeſtone. Aerated, or efferveſcent, calcareous earth. Calcareous ſpar. Cream of lime.
Carbonate of magneſia, Carbonas magneſiæ.	Magneſian earth. Magneſia alba. Aerated magneſia of Bergman. Cretaceous magneſia. Magneſian chalk. Muriatic earth of Kirwan. Count Palma's powder. Powder of Sentinelli.
Carbonate of manganeſe, Carbonas magneſii.	
Carbonate of mercury, Carbonas mercurii.	
Carbonate of molybdena, Carbonas molybdeni.	
Carbonate of nickel, Carbonas niccoli.	
Carbonate of platina, Carbonas platini.	
Carbonate of potaſh, Carbonas potaſſæ.	Fixed ſalt of tartar. Vegetable fixed alkali. Aerated vegetable fixed alkali. Cretaceous tartar. Mephitized potaſh. Nitre fixed by itſelf. Alkaheſt of Van Helmont.
Carbonate of ſilver, Carbonas argenti.	

New Names.	*Ancient Names.*
Carbonate of ſoda, Carbonas ſodæ.	Natrum, or natron. Baſe of marine ſalt. Marine or mineral alkali. Cryſtals of ſoda. Cretaceous ſoda. Aerated efferveſcent, or ſoda. Mephitized ſoda.
Carbonate of tin, Carbonas ſtanni.	
Carbonate of tunſtein, Carbonas tunſteni.	
Carbonate of zinc, Carbonas zinci.	Chalk of zinc. Aerated zinc.
Carbure of iron.	Plumbago.
Citrate Citras, tis. ſ. m.	Salt formed by the union of the acid of lemons with different baſes. This genus of ſalts had no name in the ancient nomenclature.
Citrate of alumine, Citras aluminoſus.	
Citrate of ammoniac, Citras ammoniaci.	
Citrate of antimony, Citras ſtibii.	
Citrate of arſenic, Citras arſenicalis.	
Citrate of barytes, Citras baryticus.	
Citrate of biſmuth, Citras biſmuthi.	
Citrate of cobalt, Citras cobalti.	
Citrate of copper, Citras cupri.	
Citrate of gold, Citras auri.	
Citrate of iron, Citras ferri.	
Citrate of lead, Citras plumbi.	

New Names.	*Ancient Names.*
Citrate of lime, Citras calcareus.	
Citrate of magneſia, Citras magneſiæ.	
Citrate of manganeſe, Citras magneſii.	
Citrate of mercury, Citras mercurii.	
Citrate of molybdena, Citras molybdeni.	
Citrate of nickel, Citras niccoli.	
Citrate of platina, Citras platini.	
Citrate of potaſh, Citras potaſſæ.	
Citrate of ſilver, Citras argenti.	
Citrate of ſoda, Citras ſodæ.	
Citrate of tin, Citras ſtanni.	
Citrate of tunſtein, Citras tunſteni.	
Citrate of zinc. Citras zinci.	
Cobalt.	Regulus of cobalt. Cobalt.
Copper, Cuprum.	Copper. Venus.
D.	
Diamond.	Diamond.
E.	
Ether acetic, Ether aceticum.	Acetous ether, or æther.
Ether muriatic, Ether muriaticum.	Marine ether.

Ether

New Names.	*Ancient Names.*
Ether nitric, Ether nitricum.	Nitrous ether.
Ether ſulphuric, Ether ſulphuricum.	Vitriolic ether.
Extract, Extractum.	Extract.

F.

New Names.	*Ancient Names.*
Fecula, Fecula.	Fecula of vegetables.
Fluate, Fluas, tis. ſ. m.	Salt formed by the fluoric acid, combined with different baſes.
Fluate of alumine, Fluas aluminæ.	Argillaceous fluor.
Fluate of ammoniac, Fluas ammoniacalis.	Sparry ſal ammoniac. Ammoniacal fluor.
Fluate of antimony, Fluas ſtibii.	
Fluate of arſenic, Fluas arſenicalis.	
Fluate of barytes, Fluas barytæ.	Ponderous fluor. Barytic fluor.
Fluate of biſmuth, Fluas biſmuthi.	
Fluate of cobalt, Fluas cobalti.	
Fluate of copper, Fluas cupri.	
Fluate of gold, Fluas auri.	
Fluate of iron, Fluas ferri.	
Fluate of lead, Fluas plumbi.	
Fluate of lime, Fluas calcareus.	Fluor ſpar. Vitreous ſpar. Cubic ſpar. Phoſphoric ſpar. Sparry fluor.

New Names.	*Ancient Names.*
Fluate of magneſia, Fluas magneſiæ.	Fluorated magneſia. Magneſian fluor.
Fluate of manganeſe, Fluas magneſii.	
Fluate of mercury, Fluas mercurii.	
Fluate of molybdena, Fluas molybdeni.	
Fluate of nickel, Fluas niccoli.	
Fluate platina, Fluas platini.	
Fluate of potaſh, Fluas potaſſæ.	Tartareous fluor.
Fluate of ſilver, Fluas argenti.	
Fluate of ſoda, Fluas ſodæ.	Fluor of ſoda.
Fluate of tin, Fluas ſtanni.	
Fluate of tunſtein, Fluas tunſteni.	
Fluate of zinc, Fluas zinci.	
Formiate, Formias, tis. ſ. m.	Salt produced by the union of the formic acid with different baſes. This genus of ſalt was without a name in the ancient nomenclature.
Formiate of alumine, Formias aluminoſus.	
Formiate of ammoniac, Formias ammoniacalis.	
Formiate of antimony, Formias antimonii.	
Formiate of arſenic, Formias arſenicalis.	
Formiate of barytes, Formias baryticus.	
Formiate of biſmuth, Formias biſmuthi.	
Formiate of cobalt, Formias cobalti.	

New Names.	*Ancient Names.*
Formiate of copper, Formias cupri.	
Formiate of gold, Formias auri.	
Formiate of iron, Formias ferri.	
Formiate of lead, Formias plumbi.	
Formiate of lime, Formias calcareus.	
Formiate of magneſia. Formias magneſiæ.	
Formiate of manganeſe, Formias magneſii.	
Formiate of mercury, Formias mercurii.	
Formiate of molybdena, Formias molybdeni.	
Formiate of nickel, Formias niccoli.	
Formiate of platina, Formias platini.	
Formiate of ſilver, Formias argenti.	
Formiate of ſoda, Formias ſodæ.	
Formiate of tin, Formias ſtanni.	
Formiate of tunſtein, Formias tunſteni.	
Formiate of zinc, Formias zinci.	

G.

Gas, Gas.	Gas. Elaſtic fluid. Aeriform fluid.
Gas, acetous acid, Gas acidum acetoſum.	Acetous acid gas.
Gas ammoniacal, Gas ammoniacale.	Alkaline gas. Alkaline air. Volatile alkali gas.

New Names.	*Ancient Names.*
Gas azotic, Gas azoticum.	Vitiated air. Impure air. Phlogiſticated air. Phlogiſticated gas. Atmoſpheric mephitis.
Gas, carbonic acid, Gas acidum carbonicum.	Fixed air. Solid air, of Hales. Cretaceous acid gas. Mephitic gas. Aerial acid.
Gas, carbonated hydrogenous, Gas hydrogenium carbonatum.	Inflammable gas with charcoal.
Gas, fluoric acid, Gas acidum fluoricum.	Sparry acid gas. Fluor acid gas.
Gas hydrogenous, Gas hydrogenium.	Inflammable air. Inflammable gas. The phlogiſton of Kirwan.
Gas hydrogenous of marſhes, Gas hydrogenium paludum.	Mephitized inflammable gas. Inflammable air of marſhes.
Gas, muriatic acid, Gas acidum muriaticum.	Marine air or gas, *of Dr. Prieſtley.* Muriatic acid gas.
Gas nitrous, Gas nitroſum.	Nitrous gas.
Gas, nitrous acid, Gas acidum nitroſum.	Nitrous acid gas.
Oxigenous gas, Gas oxigenium.	Vital air. Pure air. Dephlogiſticated air.
Gas, oxigenated muriatic acid, Gas acidum muriaticum oxigenatum.	Aerated muriatic acid gas. Dephlogiſticated marine acid.
Gas, Pruſſic acid, Gas acidum Pruſſicum.	Gas Pruſſian.
Gas, phoſphoriſed hydrogenous, Gas hydrogenium phoſphoriſatum.	Phoſphoric gas.

New Names.	*Ancient Names.*
Gas, ſulphurated hydrogenous, Gas hydrogenium ſulphuratum.	Hepatic gas.
Gas, ſulphureous acid. Gas acidum ſulphureum.	Sulphureous acid gas. Vitriolic acid air.
Gluten, Gluten.	Glutinous matter of flour. Vegeto-animal matter.
Gold, Aurum.	Gold.
	I.
Iron. Ferrum.	Iron. Mars.
	L.
Lactates, Lactas, tis, ſ. m.	Salts formed by the union of the acid of ſour whey, or the lactic acid, with different baſes. Theſe ſalts were unknown before the time of Scheele, and have not been hitherto named. Their properties have been very little examined.
Lactate of alumine, Lactas aluminoſus.	
Lactate of ammoniac, Lactas ammoniacalis.	
Lactate of antimony. Lactas ſtibii.	
Lactate of arſenic, Lactas arſenicalis.	
Lactate of barytes, Lactas barytæ.	
Lactate of biſmuth, Lactas biſmuthi.	
Lactate of cobalt, Lactas cobalti.	
Lactate of copper, Lactas cupri.	

New Names.	*Ancient Names.*
Lactate of gold, Lactas auri.	
Lactate of lead, Lactas plumbi.	
Lactate of lime, Lactas calcareus.	
Lactate of iron, Lactas ferri.	
Lactate of magneſia, Lactas magneſiæ.	
Lactate of manganeſe, Lactas magneſii.	
Lactate of mercury, Lactas mercurii.	
Lactate of molybdena. Lactas molybdeni.	
Lactate of nickel, Lactas niccoli.	
Lactate of platina, Lactas platini.	
Lactate of potaſh, Lactas potaſſæ.	
Lactate of ſilver. Lactas argenti.	
Lactate of ſoda, Lactas ſodæ.	
Lactate of tin, Lactas ſtanni.	
Lactate of tunſtein, Lactas tunſteni.	
Lactate of zinc, Lactas zinci.	
Lead, Plumbum.	Lead. Saturn.
Light.	Light.
Lime, or calcareous earth.	Calcareous earth. Quicklime.
Lithiates, Lithias, tis, ſ. m.	Salts formed by the combination of the lithic acid, or acid of the ſtone of the bladder, with different baſes. This genus of ſalts had no name in the ancient nomenclature, becauſe it was not known before the time of Scheele.

New Names.	*Ancient Names.*
Lithiate of alumine, Lithias aluminoſus.	
Lithiate of ammoniac, Lithias ammoniacalis.	
Lithiate of antimony, Lithias ſtibii.	
Lithiate of arſenic, Lithias arſenicalis.	
Lithiate of barytes, Lithias baryticus.	
Lithiate of biſmuth, Lithias biſmuthi.	
Lithiate of cobalt, Lithias cobalti.	
Lithiate of copper, Lithias cupri.	
Lithiate of gold, Lithias auri.	
Lithiate of iron, Lithias ferri.	
Lithiate of lead, Lithias plumbi.	
Lithiate of lime, Lithias calcareus.	
Lithiate of magneſia, Lithias magneſiæ.	
Lithiate of manganeſe, Lithias magneſii.	
Lithiate of mercury, Lithias mercurii.	
Lithiate of molybdena, Lithias molybdeni.	
Lithiate of nickel, Lithias niccoli.	
Lithiate of platina, Lithias platini.	
Lithiate of potaſh, Lithias potaſſæ.	
Lithiate of ſilver, Lithias argenti.	
Lithiate of ſoda, Lithias ſodæ.	
Lithiate of tin, Lithias ſtanni.	

New Names.	*Ancient Names.*
Lithiate of tunſtein, Lithias tunſteni.	
Lithiate of zinc, Lithias zinci.	

M.

Malates, Malas, tis, ſ. m.	Salts formed by the union of the malic acid, or acid of apples, with different baſes. This genus of ſalts has not yet been named in the ancient nomenclature.
Malate of alumine, Malas aluminoſus.	
Malate of ammoniac, Malas ammoniacalis.	
Malate of antimony, Malas ſtibii.	
Malate of arſenic, Malas arſenicalis.	
Malate of barytes, Malas baryticus.	
Malate of biſmuth, Malas biſmuthi.	
Malate of cobalt, Malas cobalti.	
Malate of copper, Malas cupri.	
Malate of gold, Malas auri.	
Malate of lead, Malas plumbi.	
Malate of lime, Malas calcareus.	
Malate of iron, Malas ferri.	
Malate of magneſia, Malas magneſiæ.	
Malate of manganeſe, Malas magneſii.	
Malate of mercury, Malas mercurii.	
Malate of molybdena, Malas molybdeni.	

New Names.	*Ancient Names.*
Malate of nickel, Malas niccoli.	
Malate of platina, Malas platini.	
Malate of potaſh, Malas potaſſæ.	
Malate of ſilver, Malas argenti.	
Malate of ſoda, Malas ſodæ.	
Malate of tin, Malas ſtanni.	
Malate of tunſtein, Malas tunſteni.	
Malate of zinc, Malas zinci.	
Manganeſe, Magneſium.	Regulus of manganeſe.
Mercury, Hydrargirum.	Mercury. Quickſilver.
Molybdates, Molybdas, tis, ſ. m.	Salts formed by the union of the molybdic acid with different baſes. This genus of ſalts was without a name in the ancient nomenclature.
Molybdate of alumine, Molybdas aluminoſus.	
Molybdate of ammoniac, Molybdas ammoniacalis.	
Molybdate of antimony, Molybdas ſtibii.	
Molybdate of arſenic, Molybdas arſenicalis.	
Molybdate of barytes, Molybdas baryticus.	
Molybdate of biſmuth, Molybdas biſmuthi.	
Molybdate of cobalt, Molybdas cobalti.	
Molybdate of copper, Molybdas cupri.	
Molybdate of gold, Molybdas auri.	

New Names.	*Ancient Names.*
Molybdate of iron, Molybdas ferri.	
Molybdate of lead, Molybdas plumbi.	
Molybdate of lime, Molybdas calcareus.	
Molybdate of magneſia, Molybdas magneſiæ.	
Molybdate of manganeſe, Molybdas magneſii.	
Molybdate of mercury, Molybdas mercurii.	
Molybdate of nickel, Molybdas niccoli.	
Molybdate of platina, Molybdas platini.	
Molybdate of potaſh, Molybdas potaſſæ.	
Molybdate of ſilver, Molybdas argenti.	
Molybdate of ſoda, Molybdas ſodæ.	
Molybdate of tin, Molybdas ſtanni.	
Molybdate of tunſtein, Molybdas tunſteni.	
Molybdate of zinc, Molybdas zinci.	
Molybdena.	Regulus of molybdena.
Mucus.	Mucilage.
Muriates, Murias, tis, ſ. m.	Salts formed by the union of the muriatic acid with different baſes.
Muriate of alumine, Murias aluminoſus.	Marine alum. Argillaceous marine ſalt.
Muriate of ammoniac, Murias ammoniacalis.	Sal ammoniac. Salmiac.
Muriate of antimony, Murias ſtibii.	Muriated antimony.
Muriate of antimony, fuming, Murias ſtibii, fumans.	Butter of antimony.
Muriate of arſenic, Murias arſenicalis.	

New Names.	*Ancient Names.*
Muriate of arſenic ſublimed, Murias arſenicalis ſublimatus.	Butter of arſenic.
Muriate of barytes, Murias baryticus.	Barytic marine ſalt.
Muriate of biſmuth, Murias biſmuthi.	Muriate of biſmuth.
Muriate of biſmuth ſublimed Murias biſmuthi ſublimatus.	Butter of biſmuth.
Muriate of cobalt, Murias cobalti.	Sympathetic ink.
Muriate of copper, Murias cupri.	Muriated copper.
Muriate of copper ſublimed, ammoniacal, Murias cupri ammoniacalis ſublimatus.	Cupreous ammoniacal flowers.
Muriate of gold, Murias auri.	Regaline ſalt of gold. Muriated gold.
Muriate of iron, Murias ferri.	Muriated iron. Marine ſalt of iron.
Muriate of lead, Murias plumbi.	Muriated lead. Plumbum corneum.
Muriate of iron ſublimed, ammoniacal.	Martial ammoniacal flowers.
Muriate of lime, Murias calcareus.	Mother water of ſea-ſalt. Calcareous marine ſalt. Fixed ſal ammoniac.
Muriate of magneſia, Murias calcareus.	Marine ſalt with baſe of magneſia.
Muriate of manganeſe, Murias magneſii.	Muriated manganeſe.
Muriate of mercury, corroſive Murias hydrargyri corroſivus.	Corroſive ſublimate.
Muriate of mercury, mild, Murias hydrargyri dulcis.	Mercurius dulcis.
Muriate of mercury ſublimed, mild, Murias hydrargyri ſublimatus.	Aquila alba.
Muriate of mercury and ammoniac, Murias hydrargyri et ammoniacalis.	Sal alembroth.

New Names.	*Ancient Names.*
Muriate of mercury by precipitation, Murias hydrargyri præcipitatus.	White precipitate. Mercurial muriate.
Muriate of molybdena, Murias molybdeni.	
Muriate of nickel, Murias niccoli.	
Muriate of platina, Murias platini.	Muriated platina. Regaline ſalt of platina.
Muriate of potaſh, Murias potaſſæ.	Febrifuge ſalt of Sylvius.
Muriate of ſilver, Murias argenti.	Luna cornea.
Muriate of ſoda, Murias ſodæ.	Sea ſalt.
Muriate of ſoda foſſile, Murias ſodæ foſſilis.	Sal gem.
Muriate of tin, Murias ſtanni.	Salt of jupiter.
Muriate of tin concrete, Murias ſtanni concretus.	Solid butter of tin, of Baumé. Corneous tin.
Muriate of tin fuming, Murias ſtanni fumans.	Fuming liquor of Libavius.
Muriate of tin ſublimed, Murias ſtanni ſublimatus.	Butter of tin.
Muriate of tunſtein, Murias tunſteni.	
Muriate of zinc, Murias zinci.	Marine ſalt of zinc. Muriated zinc.
Muriate of zinc ſublimed, Murias zinci.	Butter of zinc.
Muriates oxigenated.	New combinations of the oxigenated muriatic acid with potaſh and ſoda, diſcovered by Mr. Berthollett.
Muriate of potaſh oxigenated, Murias oxigenatus potaſſæ.	
Muriate of ſoda oxigenated, Murias oxigenatus ſodæ.	

N. Nitrates,

N.

New Names.	*Ancient Names.*
Nitrates, Nitras, tis, ſ. m.	Salts formed by the combination of the nitric acid with different baſes.
Nitrate of alumine, Nitras aluminoſus.	Nitrous alum. Argillaceous nitre.
Nitrate of ammoniac, Nitras ammoniacalis.	Nitrous ſal ammoniac. Ammoniacal nitre.
Nitrate of antimony, Nitras ſtibii.	
Nitrate of arſenic, Nitras arſenicalis.	Nitre of arſenic.
Nitrate of barytes, Nitras baryticus.	Nitrated barytes. Nitre of ponderous earth.
Nitrate of biſmuth, Nitras biſmuthi.	Nitre of biſmuth.
Nitrate of cobalt, Nitras cobalti.	Nitre of cobalt.
Nitrate of copper, Nitras cupri.	Nitre of copper.
Nitrate of gold. Nitras auri.	
Nitrate of iron, Nitras ferri.	Nitre of iron. Martial nitre.
Nitrate of lead, Nitras plumbi.	Nitre of lead. Nitre of ſaturn.
Nitrate of lime, Nitras calcareus.	Calcareous nitre. Mother water of nitre.
Nitrate of magneſia, Nitras magneſiæ.	Nitre of magneſia.
Nitrate of manganeſe, Nitras magneſii.	Nitre of manganeſe.
Nitrate of mercury, Nitras hydrargyri.	Mercurial nitre. Nitre of mercury.
Nitrate of mercury in ſolution, Nitras hydrargiri ſolutus.	Mercurial water.
Nitrate of molybdena, Nitras molybdeni.	
Nitrate of nickel, Nitras niccoli.	Nitre of nickel.

New Names.	*Ancient Names.*
Nitrate of platina, Nitras platini.	
Nitrate of potaſh or nitre, Nitras potaſſæ, vel nitrum.	Nitre; ſalt petre.
Nitrate of ſilver, Nitras argenti.	Nitre of ſilver. Lunar cryſtals.
Nitrate of ſilver fuſed, Nitras argenti fuſus.	Lunar cauſtic.
Nitrate of ſoda, Nitras ſodæ.	Cubic nitre. Rhomboidal nitre.
Nitrate of tin, Nitras ſtanni.	Nitre of tin. Stanno-nitrous ſalt.
Nitrate of tunſtein, Nitras tunſteni.	
Nitrate of zinc, Nitras zinci.	Nitre of zinc.
Nitrites, Nitris, tis, ſ. m.	Salts formed by the combination of *nitrous* acid * with different baſes. This genus of ſalts had no name in the ancient nomenclature. It was not known before the late diſcoveries.
Nitrite of alumine, Nitris aluminoſus.	
Nitrite of ammoniac, Nitris ammoniacalis.	
Nitrite of antimony, Nitris ſtibii.	
Nitrite of arſenic, Nitris arſenicalis.	
Nitrite of barytes, Nitris baryticus.	
Nitrite of biſmuth, Nitris biſmuthi.	
Nitrite of cobalt, Nitris cobalti.	
Nitrite of copper, Nitris cupri.	

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* That is to ſay, by an acid of nitre containing leſs oxigene than that which we have denominated *nitric* acid, and which forms the *nitrates*.

New Names.	*Ancient Names.*
Nitrite of gold, Nitris auri.	
Nitrite of iron, Nitris ferri.	
Nitrite of lead, Nitris plumbi.	
Nitrite of lime, Nitris calcareus.	
Nitrite of magneſia, Nitris magneſiæ.	
Nitrite of manganeſe, Nitris magneſii.	
Nitrite of mercury, Nitris hydrargiri.	
Nitrite of molybdena, Nitris molybdeni.	
Nitrite of nickel, Nitris niccoli.	
Nitrite of platina, Nitris platini.	
Nitrite of potaſh, Nitris potaſſæ.	
Nitrite of ſilver, Nitris argenti.	
Nitrite of ſoda, Nitris ſodæ.	
Nitrite of tin, Nitris ſtanni.	
Nitrite of tunſtein, Nitris tunſteni.	
Nitrite of zinc, Nitris zinci.	

O.

Oils empyreumatic. Olea empyreumatica.	Empyreumatic oils.
Oils fixed, Olea fixa.	Fat oils. Mild oils. Expreſſed oils.
Oils volatile, Olea volatilia.	Eſſential oils. Eſſences.

New Names.	*Ancient Names.*
Oxalates, Oxalas, tis, ſ. m.	Salts formed by the combination of the oxalic acid with different baſes. The greater number of theſe ſalts have not been named in the old nomenclature.
Oxalate acidulous of ammoniac, Oxalas acidulus ammoniacalis.	
Oxalate acidulous of potaſh, Oxalas acidulus potaſſæ.	The ſalt of ſorrel of commerce.
Oxalate acidulous of ſoda, Oxalas acidulus ſodæ.	
Oxalate of alumine, Oxalas aluminoſus.	
Oxalate of ammoniac, Oxalas ammoniacalis.	
Oxalate of antimony, Oxalas ſtibii.	
Oxalate of arſenic, Oxalas arſenicalis.	
Oxalate of barytes, Oxalas baryticus.	
Oxalate of biſmuth, Oxalas biſmuthi.	
Oxalate of cobalt, Oxalas cobalti.	
Oxalate of copper, Oxalas cupri.	
Oxalate of gold, Oxalas auri.	
Oxalate of iron, Oxalas ferri.	
Oxalate of lead, Oxalas plumbi.	
Oxalate of lime, Oxalas calcareus.	
Oxalate of magneſia, Oxalas magneſiæ.	
Oxalate of manganeſe, Oxalas magneſii.	
Oxalate of mercury, Oxalas hydrargyri,	

New Names.	*Ancient Names.*
Oxalate of molybdena, Oxalas molybdeni.	
Oxalate of nickel, Oxalas niccoli.	
Oxalate of platina, Oxalas platini.	
Oxalate of potaſh, Oxalas potaſſæ.	
Oxalate of ſilver, Oxalas argenti.	
Oxalate of ſoda, Oxalas ſodæ.	
Oxalate of tin, Oxalas ſtanni.	
Oxalate of tunſtein, Oxalas tunſteni.	
Oxalate of zinc, Oxalas zinci.	
Oxide arſenical of potaſh, Oxidum arſenicale potaſſæ.	Liver of arſenic.
Oxide, white, of arſenic, Oxidum arſenici album.	White arſenic. Calx of arſenic.
Oxide of antimony by the muriatic acid and nitric acid. Oxidum ſtibii acidis muriatico et nitrico confectum.	Bezoar mineral.
Oxide of antimony, white, by nitre, Oxidum ſtibii album nitro confectum.	Diaphoretic antimony. Ceruſe of antimony. The pearly matter of Kerkringius.
Oxide of antimony, white, ſublimed, Oxidum ſtibii album ſublimatum.	Snow of antimony. Flowers of antimony. Silvery flowers of regulus of antimony.
Oxide of antimony by the muriatic acid, Oxidum ſtibii acido muriatico confectum.	Powder of algaroth.
Oxide of antimony ſulphurated, Oxidum ſtibii ſulphuratum.	Liver of antimony.

New Names.	*Ancient Names.*
Oxide of antimony ſulphurated, ſemi-vitreous, Oxidum ſtibii ſulphuratum ſemi-vitreum.	Crocus metallorum.
Oxide of antimony ſulphurated, orange-coloured, Oxidum ſtibii ſulphuratum aurantiacum.	Golden ſulphur of antimony.
Oxide of antimony, red, ſulphurated, Oxidum ſtibii ſulphuratum rubrum.	Kermes mineral.
Oxide of antimony ſulphurated vitreous, Oxidum ſtibii ſulphuratum vitreum.	Glaſs of antimony.
Oxide of antimony, brown, vitreous ſulphurated, Oxidum ſtibii ſulphuratum vitreum fuſcum.	
Oxide of arſenic, white, ſublimed, Oxidum arſenici album ſublimatum.	Flowers of arſenic.
Oxide of arſenic, yellow, ſulphurated, Oxidum arſenici ſulphuratum luteum.	Orpiment.
Oxide of arſenic, red, ſulphurated, Oxidum arſenici ſulphuratum rubrum.	Red arſenic. Realgar or realgal.
Oxide of biſmuth, white, by the nitric acid, Oxidum biſmuthi album acido nitrico confectum.	Magiſtery of biſmuth. Spaniſh white.
Oxide of biſmuth ſublimed, Oxidum biſmuthi ſublimatum.	Flowers of biſmuth.
Oxide of cobalt, grey, with ſilice; or zaffre, Oxidum cobalti cinereum cum ſilice.	Zaffre.

New Names.	*Ancient Names.*
Oxide of cobalt, vitreous, Oxidum cobalti vitreum.	Azure. Smalt.
Oxide of copper, green, Oxidum cupri viride.	Verdegris. Ruſt of copper.
Oxide of gold, ammoniacal, Oxidum auri ammoniacale.	Fulminating gold.
Oxide of gold by tin, Oxidum auri per ſtannum.	Precipitate of gold by tin. Purple powder of Caſſius.
Oxides of iron, Oxida ferri.	Saffrons of mars.
Oxide of iron, brown, Oxidum ferri fuſcum.	Aſtringent ſaffron of mars.
Oxide of iron, yellow, Oxidum ferri luteum.	Ochre.
Oxide of iron, black, Oxidum ferri nigrum.	Martial ethiops.
Oxide of iron, red, Oxidum ferri rubrum.	Colcothar.
Oxides of lead, Oxida plumbi.	Calces of lead.
Oxide of lead, white, by the acetous acid, Oxidum plumbi album per acidum acetoſum.	White lead.
Oxide of lead, ſemi-vitreous; or litharge, Oxidum plumbi ſemi-vitreum.	Litharge.
Oxide of lead, yellow, Oxidum plumbi luteum.	Maſſicot.
Oxide of lead, red; or minium, Oxidum plumbi rubrum.	Minium. Red lead.
Oxide of manganeſe, white, Oxidum magneſii album.	White calx of manganeſe.
Oxide of manganeſe, black, Oxidum magneſii nigrum.	Black magneſia.
Oxide of mercury, yellow, by the nitric acid, Oxidum hydrargiri luteum acido nitrico confectum.	Nitrous turbith.

New Names.	*Ancient Names.*
Oxide of mercury, yellow, by the ſulphuric acid, Oxidum hydrargyri luteum acido ſulphurico confectum.	Turbith mineral. Yellow precipitate.
Oxide of mercury, blackiſh, Oxidum hydrargyri nigrum.	Æthiops per ſe.
Oxide of mercury, red, by the nitric acid, Oxidum hydrargyri rubrum acido nitrico confectum.	Red precipitate.
Oxide of mercury, red, by fire, Oxidum hydrargyri rubrum per ignem.	Precipitate per ſe.
Oxide of mercury ſulphurated, black, Oxidum hydrargyri ſulphuratum nigrum.	Æthiops mineral.
Oxide of mercury ſulphurated, red, Oxidum hydrargyri ſulphuratum rubrum.	Cinnabar.
Oxides metallic, Oxida metallica.	Calces of metals.
Oxides metallic ſublimed, Oxida metallica ſublimata.	Metallic flowers.
Oxide of tin, grey, Oxidum ſtanni cinereum.	Putty.
Oxide of tin ſublimed, Oxidum ſtanni ſublimatum.	Flowers of tin.
Oxide of zinc ſublimed, Oxidum zinci ſublimatum.	Flowers of zinc. Pompholix. Philoſophical wool.
Oxigene, Oxigenium.	Oxigene. Baſe of vital air. Acidifying principle. Empyreal principle. Principium ſorbile.

P.

New Names.	*Ancient Names.*
Phoſphate, Phoſphas, tis, ſ. m.	Salts formed by the union of the phoſphoric acid with different baſes.
Phoſphate of alumine, Phoſphas aluminoſus.	
Phoſphate of ammoniac, Phoſphas ammoniacalis.	Phoſphoric ammoniac. Ammoniacal phoſphate.
Phoſphate of antimony, Phoſphas ſtibii.	
Phoſphate of arſenic, Phoſphas arſenicalis.	
Phoſphate of barytes, Phoſphas baryticus.	
Phoſphate of biſmuth, Phoſphas biſmuthi.	
Phoſphate of cobalt, Phoſphas cobalti.	
Phoſphate of copper, Phoſphas cupri.	
Phoſphate of gold, Phoſphas auri.	
Phoſphate of iron, Phoſphas ferri.	Syderite. Bog ore.
Phoſphate of lead, Phoſphas plumbi.	
Phoſphate of lime, Phoſphas calcareus.	Earth of bones. Calcareous phoſphate. Animal earth.
Phoſphate of magneſia, Phoſphas magneſiæ.	Phoſphate of magneſia.
Phoſphate of mangaueſe, Phoſphas magneſii.	
Phoſphate of mercury, Phoſphas mercurii.	Lemery's roſe-coloured precipitate.
Phoſphate of molybdena, Phoſphas molybdeni.	
Phoſphate of nickel, Phoſphas niccoli.	
Phoſphate of platina, Phoſphas platini.	

Phoſphate

New Names.	*Ancient Names.*
Phoſphate of potaſh, Phoſphas potaſſæ.	
Phoſphate of ſilver, Phoſphas argenti.	
Phoſphate of ſoda, Phoſphas ſodæ.	
Phoſphate of ſoda and ammoniac, Phoſphas ſodæ et ammoniacalis.	Native ſalt of urine. Fuſible ſalts of urine.
Phoſphate ſuperſaturated with ſoda, Phoſphas ſuperſaturatus ſodæ.	Sal mirabile perlatum.
Phoſphate of tin, Phoſphas ſtanni.	
Phoſphate of tunſtein, Phoſphas tunſteni.	
Phoſphate of zinc, Phoſphas zinci.	
Phoſphite, Phoſphis, tis, ſ. m.	Salt formed by the combination of the phoſphoreous acid with different baſes.
Phoſphite of alumine, Phoſphis aluminoſus.	
Phoſphite of ammoniac, Phoſphis ammoniacalis.	
Phoſphite of antimony, Phoſphis ſtibii.	
Phoſphite of arſenic, Phoſphis arſenicalis.	
Phoſphite of barytes, Phoſphis baryticus.	
Phoſphite of biſmuth, Phoſphis biſmuthi.	
Phoſphite of cobalt, Phoſphis cobalti.	
Phoſphite of copper, Phoſphis cupri.	
Phoſphite of gold, Phoſphis auri.	
Phoſphite of iron, Phoſphis ferri.	

New Names.	*Ancient Names.*
Phoſphite of lead, Phoſphis plumbi.	
Phoſphite of lime, Phoſphis calcareus.	
Phoſphite of magneſia, Phoſphis magneſiæ.	
Phoſphite of manganeſe, Phoſphis magneſii.	
Phoſphite of mercury, Phoſphis hydrargyri.	
Phoſphite of molybdena, Phoſphis molybdeni.	
Phoſphite of nickel, Phoſphis niccoli.	
Phoſphite of platina, Phoſphis platini.	
Phoſphite of potaſh, Phoſphis potaſſæ.	
Phoſphite of ſilver, Phoſphis argenti.	
Phoſphite of ſoda, Phoſphis ſodæ.	
Phoſphite of tin, Phoſphis ſtanni.	
Phoſphite of tunſtein, Phoſphis tunſteni.	
Phoſphite of zinc, Phoſphis zinci.	
Phoſphorus, Phoſphorum.	Phoſphorus of Kunckel.
Phoſphure, Phoſphoretum.	Combination of phoſphorus not oxigenated, with different baſes.
Phoſphure of copper, Phoſphoretum cupri.	
Phoſphure of iron, Phoſphoretum ferri.	Syderum, *of Bergman.* Syderotete, *of M. de Morveau.* Regulus of ſyderite.
Pyrolignites, Pyrolignis, tis, ſ. m.	Salts formed by the union of the pyroligneous acid with different baſes. Theſe ſalts were not named in the ancient nomenclature.

New Names.	*Ancient Names.*
Pyrolignite of alumine, Pyrolignis aluminoſus.	
Pyrolignite of ammoniac, Pyrolignis ammoniacalis.	
Pyrolignite of antimony, Pyrolignis ſtibii.	
Pyrolignite of arſenic, Pyrolignis arſenicalis.	
Pyrolignite of barytes, Pyrolignis baryticus.	
Pyrolignite of biſmuth, Pyrolignis biſmuthi.	
Pyrolignite of cobalt, Pyrolignis cobalti.	
Pyrolignite of copper, Pyrolignis cupri.	
Pyrolignite of gold, Pyrolignis auri.	
Pyrolignite of iron, Pyrolignis ferri.	
Pyrolignite of lead, Pyrolignis plumbi.	
Pyrolignite of lime, Pyrolignis calcareus.	
Pyrolignite of magneſia, Pyrolignis magneſiæ.	
Pyrolignite of manganeſe, Pyrolignis magneſii.	
Pyrolignite of mercury, Pyrolignis mercurii.	
Pyrolignite of molybdena, Pyrolignis molybdeni.	
Pyrolignite of nickel, Pyrolignis niccoli.	
Pyrolignite of platina, Pyrolignis platini.	
Pyrolignite of potaſh, Pyrolignis potaſſæ.	
Pyrolignite of ſilver. Pyrolignis argenti.	
Pyrolignite of ſoda, Pyrolignis ſodæ.	
Pyrolignite of tin, Pyrolignis ſtanni.	

New Names.	*Ancient Names.*
Pyrolignite of tunſtein, Pyrolignis tunſteni.	
Pyrolignite of zinc, Pyrolignis zinci.	
Pyromucites, Pyromucis, tis, ſ. m.	Salts formed by the union of the pyromucous acid with different baſes. This genus of ſalts was not named in the old nomenclature.
Pyromucite of alumine. Pyromucis aluminoſus.	
Pyromucite of ammoniac, Pyromucis ammoniacalis.	
Pyromucite of antimony, Pyromucis ſtibii.	
Pyromucite of arſenic, Pyromucis arſenicalis.	
Pyromucite of barytes, Pyromucis baryticus.	
Pyromucite of biſmuth, Pyromucis biſmuthi.	
Pyromucite of cobalt, Pyromucis cobalti.	
Pyromucite of copper, Pyromucis cupri.	
Pyromucite of gold, Pyromucis auri.	
Pyromucite of iron, Pyromucis ferri.	
Pyromucite of lead, Pyromucis plumbi.	
Pyromucite of lime, Pyromucis calcareus.	
Pyromucite of magneſia, Pyromucis magneſiæ.	
Pyromucite of manganeſe, Pyromucis magneſii.	
Pyromucite of mercury, Pyromucis mercurii.	
Pyromucite of molybdena, Pyromucis molybdeni.	
Pyromucite of nickel, Pyromucis niccoli.	

New Names.	*Ancient Names.*
Pyromucite of platina, Pyromucis platini.	
Pyromucite of potaſh. Pyromucis potaſſæ.	
Pyromucite of ſilver, Pyromucis argenti.	
Pyromucite of ſoda, Pyromucis ſodæ.	
Pyromucite of tin, Pyromucis ſtanni.	
Pyromucite of tunſtein, Pyromucis tunſteni.	
Pyromucite of zinc, Pyromucis zinci.	
Pyrotartrites, Pyrotartris, tis, ſ. m.	Salts formed by the combination of the pyrotartareous acid with different baſes.
Pyrotartrite of alumine, Pyrotartris aluminoſus.	
Pyrotartrite of ammoniac, Pyrotartris ammoniaci.	
Pyrotartrite of antimony. Pyrotartris ſtibii.	
Pyrotartrite of arſenic, Pyrotartris arſenici.	
Pyrotartrite of barytes, Pyrotartris baryticus.	
Pyrotartrite of biſmuth, Pyrotartris biſmuthi.	
Pyrotartrite of cobalt, Pyrotartris cobalti.	
Pyrotartrite of copper, Pyrotartris cupri.	
Pyrotartrite of gold, Pyrotartris auri.	
Pyrotartrite of iron, Pyrotartris ferri.	
Pyrotartrite of lead, Pyrotartris plumbi.	
Pyrotartrite of lime, Pyrotartris calcareus.	
Pyrotartrite of magneſia, Pyrotartris magneſiæ.	

TABLE OF THE CHYMICAL NOMENCLATURE.

Propoſed by Meſſrs. De Morveau, Lavoiſier, Berthollett, and De Fourcroy, in May, 1787.

{No. II. to be placed at the End of the Supplement to Fourcroy's Chemiſtry.

		I. SUBSTANCES NOT DECOMPOSED.		II. CONVERTED INTO THE STATE OF GAS BY CALORIC.		III. COMBINED WITH OXIGENE.		IV. GASEOUS AND OXIGENATED.		V. OXIGENATED WITH BASES.		VI. COMBINED WITHOUT BEING CONVERTED INTO THE ACID STATE.		
		NEW NAMES.	ANCIENT NAMES.	*NEW NAMES.*	ANCIENT NAMES.	*NEW NAMES.*	ANCIENT NAMES.	*NEW NAMES.*	ANCIENT NAMES.	*NEW NAMES.*	ANCIENT NAMES	*NEW NAMES.*	ANCIENT NAMES.	
1		Light.												1
2		Caloric.	*Latent heat, or the matter of heat.*											2
3		Oxigene.	*Baſe of vital air.*	Oxigenous gas. N. B. It appears that light aſſiſts its converſion into the ſtate of gas.	*Dephlogiſticated air, or vital air.*									3
4		Hydrogene.	*Baſe of inflammable gas.*	Hydrogenous gas.	*Inflammable gas.*	Water.	*Water.*							4
5	ACIDIFIABLE BASES.	Azote, or the Nitric radical.	*Baſe of phlogiſticated air, or the atmoſpherical mephitis.*	Azotic gas.	*Phlogiſticated air, or atmoſpherical mephitis.*	Baſe of nitrous gas. Nitric acid. And with exceſs of azote. Nitrous acid.	*Baſe of nitrous gas.* *Colourleſs nitrous acid.* *Fuming nitrous acid.*	Nitrous gas. Nitrous acid gas.		Nitrate of potaſh. Nitrate of ſoda, &c. Nitrite of potaſh.	*Common nitre.* *Cubic nitre.*			5
6		Carbone, or the Carbonic radical.	*Pure charcoal.*			Carbonic acid.	*Fixed air, or cretaceous acid.*	Carbonic acid gas.	*Fixed air, mephitic air.*	Carbonate of lime. of potaſh, &c. of iron.	*Chalk.* *Aerated alkalis.* *Ruſt of iron.*	Carbure of iron.	*Plumbago.*	6
7		Sulphur, or the Sulphuric radical.				Sulphuric acid. And with leſs oxigene, Sulphureous acid.	*Vitriolic acid.* *Sulphureous acid.*	Sulphureous acid gas.	*Sulphureous acid gas.*	Sulphate of potaſh. of ſoda. of lime. of alumina. of barytes. of iron, &c. Sulphite of potaſh, &c.	*Vitriolated tartar.* *Glauber's ſalt.* *Selenite.* *Alum.* *Ponderous ſpar.* *Vitriol of iron.* *Stahl's ſulphureous ſalt.*	Sulphure of iron. of antimony. of lead, &c. Sulphurated hydrogenous gas. Sulphure of potaſh. Sulphure of ſoda, &c. Alkaline ſulphures containing metals. Alkaline ſulphures containing charcoal.	*Factitious pyrites of iron.* *Antimony.* *Hepatic gas.* *Alkaline livers of ſulphur.* *Metallic liver of ſulphur.* *Liver of ſulphur containing charcoal.*	7
8		Phoſphorus, or Phoſphoric radical.				Phoſphoric acid. And with leſs oxigene. Phoſphorous acid.	*Phoſphoric acid.* *Fuming or volatile phoſphoric acid.*			Phoſphate of ſoda of lime, &c. Superſaturated phoſphate of ſoda. Phoſphite of potaſh, &c.	*Phoſphoric ſalt with baſe of natrum.* *Earth of bones.* *Haupt's pearly ſalt.*	Phoſphorised hydrogenous gas. Phoſphure of iron.	*Phoſphoric gas.* *Syderite.*	8
9		Muriatic radical.				Muriatic acid. And with leſs oxigene. Oxigenated muriatic acid.	*Marine acid.* *Dephlogiſticated marine acid.*	Muriatic acid gas. Oxigenated muriatic acid gas.	*Marine acid gas.* *Dephlogiſticated marine acid gas.*	Muriate of potaſh. of ſoda. of lime, &c. of ammoniac. Oxigenated muriate of ſoda, &c.	*Febrifuge ſalt of Sylvius.* *Sea ſalt.* *Calcareous ſea ſalt.* *Sal ammoniac.*			9
10		Boracic radical.				Boracic acid.	*Sedative ſalt.*			Borate ſuperſaturated with ſoda, or borax Borate of ſoda, &c. the ſoda ſaturated with acid.	*Common borax.*			10
11		Fluoric radical.				Fluoric acid.	*Acid of ſpar.*	Fluoric acid gas.	*Sparry acid gas.*	Fluate of lime, &c.	*Fluor ſpar.*			11
12		Succinic radical.				Succinic acid.	*Volatile ſalt of amber.*			Succinate of ſoda, &c.				12
13		Acetic radical.				Acetous acid. And with more oxigene. Acetic acid.	*Diſtilled vinegar.* *Radical vinegar.*			Acetite of potaſh. of ſoda. of lime. of ammoniac. of lead. of copper. Acetate of ſoda, &c.	*Terra foliata tartari.* *Mineral foliated earth.* *Calcareous acetous ſalt.* *Mindererus's ſpirit.* *Sugar of lead.* *Verdegriſe.*			13
14		Tartaric radical.				Tartareous acid.				Acidulous tartrite of potaſh. Tartrite of potaſh. Tartrite of ſoda, &c.	*Cream of tartar.* *Vegetable ſalt.* *Salt of Seignette.*			14
15		Pyro-tartaric radical.				Pyro-tartareous acid.	*Empyreumatic tartareous acid, or ſpirit of tartar.*			Pyro-tartrite of lime. Pyro-tartrite of iron, &c.				15
16		Oxalic radical.				Oxalic acid.	*Saccharine acid.*			Acidulous oxalate of potaſh. Oxalate of lime. of ſoda, &c.	*Salt of ſorrel.*			16
17		Gallic radical.				Gallic acid.	*Aſtringent principle.*			Gallate of ſoda. of magneſia. of iron.				17
18		Citric radical.				Citric acid.	*Lemon-juice.*			Citrate of potaſh. Citrate of lead, &c.	*Foliated earth with lemon-juice.*			18
19		Malic radical.				Malic acid.	*Acid of apples.*			Malate of lime, &c.				19
20		Benzoic radical.				Benzoic acid.	*Flowers of benzoin.*			Aluminous benzoate. Benzoate of iron, &c.				20
21		Pyro-lignic radical.				Pyro-ligneous acid.	*Spirit of box.*			Pyro-lignite of lime. Pyro-lignite of zinc.				21
22		Pyro-mucic radical.				Pyro-mucous acid.	*Spirit of honey, of ſugar, &c.*			Pyro-mucite of magneſia. Ammoniacal pyro-mucite, &c.				22
23		Camphoric radical.				Camphoric acid.				Camphorate of ſoda, &c.				23
24		Lactic radical.				Lactic acid.	*Acid of milk.*			Lactate of lime, &c.				24
25		Saccho-lactic radical.				Saccho-lactic acid.	*Acid of the ſugar of milk.*			Saccholate of iron, &c.				25
26		Formic radical.				Formic acid.	*Acid of ants.*			Ammoniacal formiate, &c.	*Spirit of magnanimity.*			26
27		Pruſſic radical.				Pruſſic acid.	*Colouring matter of Pruſſian blue.*			Pruſſiate of potaſh, &c. Pruſſiate of iron, &c.	*Phlogiſticated alkali, or Pruſſian alkali.* *Pruſſian blue.*			27
28		Sebacic radical.				Sebacic acid.	*Acid of fat.*			Sebate of lime, &c.				28
29		Lithic radical.				Lithic acid.	*Acid of the ſtone of the bladder.*			Lithiate of ſoda, &c.				29
30		Bombic radical.				Bombic acid.	*Acid of ſilk-worms.*			Bombiate of iron, &c.				30
								OXIDES WITH VARIOUS BASES*.						
31	METALLIC SUBSTANCES.	Arſenic.	*Regulus of arſenic.*			Oxide of arſenic. And with more oxigene, Arſenic acid.	*White arſenic, or calx of arſenic.* *Arſenical acid.*	Yellow Red Sulphurated oxide of arſenic. Arſenical oxide of potaſh.	*Orpiment* *Realgar.* *Liver of arſenic.*	Arſeniate of potaſh, &c. Arſeniate of copper, &c.	*Macquer's arſenical neutral ſalt.*	Alloy of arſenic and tin.	*Arſenicated tin.*	31
32		Molybdena.				Oxide of molybdena. Molybdic acid.	*Calx of molybdena.*	Sulphure of molybdena.	*Molybdena.*	Molybdate.		Alloy, &c.		32
33		Tungſtein.				Oxide of tungſtein. Tungſtic acid.	*Yellow calx of tungſtein, or tungſtein.*			Calcareous tungſtate.	*Tungſtein of the Swedes.*	Alloy, &c.		33
34		Manganeſe.	*Regulus of manganeſe.*			White Black Vitreous Oxide of manganeſe.	*Manganeſe.*					Alloy of manganeſe and iron.		34
35		Nickel.				Oxide of nickel.	*Calx of nickel.*					Alloy of nickel, &c.		35
36		Cobalt.	*Regulus of cobalt.*			Grey oxide of cobalt. Vitreous oxide of cobalt.	*Calx of cobalt.*	Alkaline cobaltic oxides.	*Precipitates of cobalt re-diſſolved by alkalies.*			Alloy, &c.		36
37		Biſmuth.				White Yellow Vitreous Oxide of biſmuth.	*Magiſtery of biſmuth.* *Yellow calx of biſmuth.* *Glaſs of biſmuth.*	Sulphurated oxide of biſmuth.	*Biſmuth precipitated by liver of ſulphur.*			Alloy, &c.		37
38		Antimony.	*Regulus of antimony.*			White oxide of antimony by the nitrous acid. by the muriatic acid. White ſublimated oxide of antimony. Vitreous oxide of antimony	*Diaphoretic antimony.* *Powder of algareth.* *Flowers or ſnow of antimony.* *Glaſs of regulus of antimony.*	Grey Red Orange Vitreous Sulphurated oxide of antimony. Alkaline oxide of antimony.	*Grey calx of antimony.* *Kermes mineral.* *Golden ſulphur of antimony.* *Glaſs and liver of antimony.*			Alloy, &c.		38
39		Zink.				Oxide of zinc. Sublimated oxide of zinc.	*Calx of zinc.* *Flowers of zinc. Pompholix, &c.*	Sulphurated oxide of zinc.	*Precipitate of zinc by liver of ſulphur.*			Alloy, &c.		39
40		Iron.				Black oxide of iron. Red oxide of iron.	*Ethiops of iron.* *Aſtringent ſaffron of Mars.*	Sulphurated oxide of iron.				Alloy, &c.		40
41		Tin.				White oxide of tin.	*Calx of tin.*	Yellow ſulphurated oxide of tin	*Aurum muſivum.*			Alloy, &c.		41
42		Lead.				White oxide of lead. Yellow oxide of lead. Red oxide of lead. Vitreous oxide of lead.	*Ceruſe, or white lead.* *Maſſicot.* *Minium.* *Litharge.*	Sulphurated oxide of lead.				Alloy, &c.		42
43		Copper.				Red oxide of copper. Green oxide of copper. Blue oxide of copper.	*Brown calx of copper.* *Green calx of copper, or verdegriſe.* *Mountain blue.*	Ammoniacal oxide of copper.				Alloy, &c.		43
44		Mercury.				Blackiſh Yellow Red Mercurial oxide.	*Ethiops per ſe.* *Turbith mineral.* *Precipitate per ſe.*	Black Red Sulphurated oxide of mercury.	*Ethiops mineral.* *Cinnabar.*			Alloy, &c.		44
45		Silver.				Oxide of ſilver.	*Calx of ſilver.*	Sulphurated oxide of ſilver.				Alloy, &c.		45
46		Platina.				Oxide of platina.	*Calx of platina.*					Alloy of platina and gold.		46
47		Gold.				Oxide of gold.	*Calx of gold.*					Alloy, &c.		47
48	EARTHS.	Silex.	*Vitrifiable earth, quartz, &c.*											48
49		Alumine.	*Argillaceous earth, or earth of alum.*											49
50		Barytes.	*Barytes, ponderous earth.*											50
51		Lime.	*Calcareous earth.*											51
52		Magneſia.	*Magneſia.*											52
53	ALKALIES.	Potaſh.	*Vegetable fixed alkali, ſalt of tartar, &c.*											53
54		Soda.	*Mineral alkali. Marine alkali. Natrum.*											54
55		Ammoniac.	*Fluor, or cauſtic volatile alkali.*	Ammoniacal gas.	*Alkaline gas.*									55

NAMES GIVEN TO SEVERAL MORE COMPOUND SUBSTANCES WHICH COMBINE WITHOUT DECOMPOSITION.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
NEW NAMES.	Mucus.	Gluten.	Sugar.	Starch.	Fixed oil.	Volatile oil.	Aroma.	Reſin.	Extract.	Extracto-reſinous matter, when the extract predominates.	Reſino-extractive matter, when the reſin predominates.	Fecula.	Alcohol, or ſpirit of wine.	Alcohol of potaſh. of guaiacum. of ſcammony. of myrrh, &c.	Nitrous alcohol. Gallic alcohol. Muriatic alcohol.	Sulphuric ether. Muriatic ether. Acetic ether.	Alkaline ſoaps. Earthy ſoaps. Acid ſoaps. Metallic ſoaps. Saponul of turp. &c.
ANCIENT NAMES.	*Mucilage.*	*Glutinous matter.*	*Saccharine matter.*	*Amylaceous matter.*	*Unctuous, or fat oil.*	*Eſſential oil.*	*Spiritus rector.*	*Reſin.*	*Extractive Matter.*			*Fecula.*	*Spirit of wine.*	*Alkaline tincture.* *Tincture of guaiacum.* *of ſcammony.* *of myrrh, &c.*	*Dulcified ſpirit of nitre.* *Tincture of galls.* *Dulcified marine acid.*	*Frobenius's ether.* *Marine ether.* *Acetous ether, &c.*	*Alkaline ſoaps.* *Earthy ſoaps, &c.* *Combination of the volatile oils with different baſes.*

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* As the ſubſtances placed in the inferior part of this column cannot be converted into the ſtate of gas as well as many which are ſituated above them, we have changed the title of the column, and by means of that which we have ſubſtituted we expreſs certain combinations of metals.

d of the Supplement to Fourcroy's Chemiſtry.]

CÉPÈDE.

ous Quadrupeds which have no Tail.

Pipa.	the eyes very ſmall and at a great diſtance from each other.
Horned T. *C. Cornu.*	The upper eyelids very much raiſed in the form of an acute cone.
Agua.	The back grey, interſperſed with reddiſh ſpots, and almoſt of the colour of fire.
Marbled T. *C. Marbre.*	The back marbled with red, and a dirty yellow colour, the belly yellow, ſpotted with black.
Noiſy T. *C. Criard.*	The back ſpotted with brown, the ſhoulders raiſed, and very porous, five toes on each foot.

New Names.	*Ancient Names.*
Pyrotartrite of manganeſe, Pyrotartris magneſii.	
Pyrotartrite of mercury, Pyrotartris hydrargyri.	
Pyrotartrite of molybdena, Pyrotartris molybdeni.	
Pyrotartrite of nickel, Pyrotartris niccoli.	
Pyrotartrite of platina, Pyrotartris platini.	
Pyrotartrite of potaſh, Pyrotartris potaſſæ.	
Pyrotartrite of ſilver, Pyrotartris argenti.	
Pyrotartrite of ſoda, Pyrotartris ſodæ.	
Pyrotartrite of tin, Pyrotartris ſtanni.	
Pyrotartrite of tunſtein, Pyrotartris tunſteni.	
Pyrotartrite of zinc, Pyrotartris zinci.	
Platina, Platinum.	Juan blanca. Platina. Platina del pinto.
Potaſh, Potaſſa, æ, f.	Cauſtic vegetable fixed alkali.
Potaſh fuſed, Potaſſa fuſa.	Lapis cauſticus.
Potaſh, ſiliciated, fluid, Potaſſa ſilicea fluida.	Liquor of flints.
Pruſſiates, Pruſſias, tis, ſ. m.	Salts formed by the union of the Pruſſic acid, or colouring matter of Pruſſian blue, with different baſes. This genus of ſalts had no name in the old nomenclature.
Pruſſiate of alumine, Pruſſias aluminoſus.	
Pruſſiate of ammoniac, Pruſſias ammoniacalis.	
Pruſſiate of antimony, Pruſſias antimonii.	

New Names.	*Ancient Names.*
Pruſſiate of arſenic, Pruſſias arſenicalis.	
Pruſſiate of barytes, Pruſſias baryticus.	
Pruſſiate of biſmuth, Pruſſias biſmuthi.	
Pruſſiate of cobalt, Pruſſias cobalti.	
Pruſſiate of copper, Pruſſias cupri.	
Pruſſiate of gold, Pruſſias auri.	
Pruſſiate of iron, Pruſſias ferri.	Pruſſian blue. Berlin blue.
Pruſſiate of lead, Pruſſias plumbi.	
Pruſſiate of lime, Pruſſias calcareus.	Calcareous pruſſiate. Pruſſian lime-water.
Pruſſiate of magneſia, Pruſſias magneſiæ.	
Pruſſiate of manganeſe, Pruſſias magneſii.	
Pruſſiate of mercury, Pruſſias hydrargyri.	
Pruſſiate of molybdena, Pruſſias molybdeni.	
Pruſſiate of nickel, Pruſſias niccoli.	
Pruſſiate of platina, Pruſſias platini.	
Pruſſiate of potaſh, Pruſſias potaſſæ.	Liquor ſaturated with the colouring matter of Pruſſian blue.
Pruſſiate of potaſh ferruginous, ſaturated, Pruſſias potaſſæ ferruginoſus ſaturatus.	Pruſſian alkali.
Pruſſiate of potaſh ferruginous, not ſaturated, Pruſſias potaſſæ ferruginoſus non ſaturatus.	Phlogiſticated alkali.
Pruſſiate of ſilver, Pruſſias argenti.	
Pruſſiate of ſoda, Pruſſias ſodæ.	

New Names.	*Ancient Names.*
Pruſſiate of tin, Pruſſias ſtanni.	
Pyrophore of Homberg, Pyrophorum Hombergii.	Pyrophorus of Homberg.

R.

New Names.	*Ancient Names.*
Reſins, Reſinæ.	Reſins.

S.

New Names.	*Ancient Names.*
Saccholates, Saccholas, tis, ſ. m.	Salts formed by the combination of the ſaccholactic acid with different baſes. This genus of ſalts was not named in the ancient nomenclature.
Saccholate of alumine, Saccholas aluminoſus.	
Saccholate of ammoniac, Saccholas ammoniacalis.	
Saccholate of antimony, Saccholas ſtibii.	
Saccholate of arſenic, Saccholas arſenicalis.	
Saccholate of barytes, Saccholas baryticus.	
Saccholate of biſmuth, Saccholas biſmuthi.	
Saccholate of cobalt, Saccholas cobalti.	
Saccholate of copper, Saccholas cupri.	
Saccholate of gold, Saccholas auri.	
Saccholate of iron, Saccholas ferri.	
Saccholate of lead, Saccholas plumbi.	
Saccholate of lime, Saccholas calcareus.	

New Names.	*Ancient Names.*
Saccholate of magneſia, Saccholas magneſiæ.	
Saccholate of manganeſe, Saccholas magneſii.	
Saccholate of mercury, Saccholas hydrargyri.	
Saccholate of molybdena, Saccholas molybdeni.	
Saccholate of nickel, Saccholas niccoli.	
Saccholate of platina, Saccholas platini.	
Saccholate of potaſh, Saccholas potaſſæ.	
Saccholate of ſilver, Saccholas argenti.	
Saccholate of ſoda, Saccholas ſodæ.	
Saccholate of tin, Saccholas ſtanni.	
Saccholate of tunſtein, Saccholas tunſteni.	
Saccholate of zinc, Saccholas zinci.	
Savonules, Saponuli.	Combinations of the volatile or eſſential oils with different baſes.
Savonules acid.	Combinations of the volatile or eſſential oils with the different acids.
Savonule of alumine, Saponulus aluminoſus.	Soap compoſed of volatile oil united to the baſe of alum.
Savonule ammoniacal, Saponulus ammoniacalis.	Soap compoſed of volatile oil united to ammoniac.
Savonule of barytes, Saponulus barytæ.	Soap compoſed of volatile oil united to barytes.
Savonule of lime, Saponulus calcareus.	Soap compoſed of volatile oil united to lime.
Savonules metallic, Saponuli metallici.	Soaps compoſed of the volatile oils united to metallic ſubſtances.
Savonule of potaſh, Saponulus potaſſæ.	Soap compoſed of volatile oil united to vegetable fixed alali, to *Starkey's ſoap*.

New Names.	*Ancient Names.*
Savonule of ſoda, Saponulus ſodæ.	Soap compoſed of volatile oil united to mineral fixed alkali, or ſoda.
Sebates, Sebas, tis, ſ. m.	Salts formed by the combination of the acid of fat, or ſebacic acid, with different baſes. Theſe ſalts had no names in the ancient nomenclature.
Sebate of alumine, Sebas aluminoſus.	
Sebate of ammoniac, Sebas ammoniacalis.	
Sebate of antimony, Sebas ſtibii.	
Sebate of arſenic, Sebas arſenicalis.	
Sebate of barytes, Sebas baryticus.	
Sebate of biſmuth, Sebas biſmuthi.	
Sebate of cobalt, Sebas cobalti.	
Sebate of copper, Sebas cupri.	
Sebate of gold, Sebas auri.	
Sebate of iron, Sebas ferri.	
Sebate of lead, Sebas plumbi.	
Sebate of lime, Sebas calcareus.	
Sebate of magneſia, Sebas magneſiæ.	
Sebate of manganeſe, Sebas magneſii.	
Sebate of mercury, Sebas hydrargyri.	
Sebate of molybdena, Sebas molybdeni.	
Sebate of nickel, Sebas niccoli.	
Sebate of platina, Sebas platini.	

New Names.	*Ancient Names.*
Sebate of potaſh, Sebas potaſſæ.	
Sebate of ſilver, Sebas argenti.	
Sebate of ſoda, Sebas ſodæ.	
Sebate of tin, Sebas ſtanni.	
Sebate of tunſtein, Sebas tunſteni.	
Sebate of zinc, Sebas zinci.	
Semi-metals.	Semi-metals.
Silice, or ſiliceous earth, Silica, terra ſilicea.	Quartzoſe earth. Siliceous earth. Vitrifiable earth.
Soda, Soda.	Cauſtic ſoda. Marine alkali. Mineral alkali.
Soaps, Sapones.	Combinations of unctuous or fixed oils with different baſes.
Soaps acid, Sapones acidi.	Combinations of unctuous or fixed oils with different acids.
Soap of alumine, Sapo aluminoſus.	Soap compoſed of fixed oil united to the baſis of alum.
Soap of ammoniac, or ammoniacal, Sapo ammoniacalis.	Soap compoſed of fixed oil united to volatile alkali.
Soap of barytes, Sapo baryticus.	Soap compoſed of fixed oil united to barytes.
Soap of lime, Sapo calcareus.	Soap compoſed of fixed oil united to lime.
Soap of magneſia, Sapo magneſiæ.	Soap compoſed of fixed oil united to magneſia.
Soaps metallic, Sapones metallici	Combinations of fixed oils with metallic ſubſtances.
Soap of potaſh, Sapo potaſſæ.	Soap compoſed of fixed oil united to vegetable fixed alkali.
Soap of ſoda, Sapo ſodæ.	Soap compoſed of fixed oil united to mineral fixed alkali.
Starch, Amylum.	Starch.

New Names.	*Ancient Names.*
Steel, Chalybs.	Steel.
Succinates, Succinas, tis, ſ. m.	Salts formed by the combination of the acid of amber, or ſuccinic acid, with different baſes.
Succinate of alumine, Succinas aluminoſus.	
Succinate of ammoniac, Succinas ammoniacalis.	
Succinate of antimony, Succinas ſtibii.	
Succinate of arſenic, Succinas arſenicalis.	
Succinate of barytes, Succinas baryticus.	
Succinate of biſmuth, Succinas biſmuthi.	
Succinate of cobalt, Succinas cobalti.	
Succinate of copper, Succinas cupri.	
Succinate of gold, Succinas auri.	
Succinate of iron, Succinas ferri.	
Succinate of lead, Succinas plumbi.	
Succinate of lime, Succinas calcareus.	
Succinate of magneſia. Succinas magneſiæ.	
Succinate of manganeſe. Succinas magneſii.	
Succinate of mercury, Succinas hydrargyri.	
Succinate of molybdena, Succinas molybdeni.	
Succinate of nickel, Succinas niccoli.	
Succinate of platina, Succinas platini.	
Succinate of potaſh, Succinas potaſſæ.	

New Names.	*Ancient Names.*
Succinate of ſilver, Succinas argenti.	
Succinate of ſoda, Succinas ſodæ.	
Succinate of tin, Succinas ſtanni.	
Succinate of tunſtein, Succinas tunſteni.	
Succinate of zinc, Succinas zinci.	
Succinum, or amber, Succinum.	Yellow amber.
Sugar, Saccharum.	Sugar.
Sugar cryſtalliſed, Saccharum cryſtalliſatum.	Sugar candied.
Sugar of milk, Saccharum lactis.	Sugar of milk. Salt of milk.
Sulphates, Sulphas aluminoſus.	Alum. Vitriol of clay.
Sulphate of ammoniac, Sulphas ammoniacalis.	The ſecret ammoniacal ſalt of Glauber. Ammoniacal vitriol.
Sulphate of antimony, Sulphas ſtibii.	Vitriol of antimony.
Sulphate of arſenic, Sulphas arſenicalis.	Vitriol of arſenic.
Sulphate of barytes, Sulphas baryticus.	Ponderous ſpar. Barytic vitriol.
Sulphate of biſmuth, Sulphas biſmuthi.	Vitriol of biſmuth.
Sulphate of cobalt, Sulphas cobalti.	Vitriol of cobalt.
Sulphate of copper, Sulphas cupri.	Cyprian vitriol, blue vitriol. Vitriol of copper, or of Venus. Blue copperas.
Sulphate of iron, Sulphas ferri.	Green copperas. Martial vitriol. Green vitriol. Vitriol of iron.
Sulphate of gold, Sulphas auri.	
Sulphate of lead, Sulphas plumbi.	Vitriol of lead.

New Names.	*Ancient Names.*
Sulphate of lime, Sulphas calcareus.	Vitriol of lime. Selenite. Gypſum. Calcareous vitriol.
Sulphate of magneſia; Sulphus magneſiæ.	Magneſian vitriol. Bitter purging ſalt. Sedlitz ſalt. Epſom ſalt. Seydſchutz ſalt.
Sulphate of manganeſe, Sulphas magneſii.	Vitriol of manganeſe.
Sulphate of mercury, Sulphas hydrargyri.	Vitriol of mercury.
Sulphate of molybdena, Sulphas molybdeni.	
Sulphate of nickel, Sulphas niccoli.	
Sulphate of platina, Sulphas platini.	
Sulphate of potaſh. Sulphas potaſſæ.	Vitriolated vegetable alkali. Sal de duobus. Vitriolated tartar. Arcanum duplicatum. Sal polychreſt of Glaſer.
Sulphate of ſilver, Sulphas argenti.	Vitriol of ſilver. Lunar vitriol.
Sulphate of ſoda, Sulphas ſodæ.	Glauber's ſalt. Vitriol of ſoda.
Sulphate of tin, Sulphas ſtanni.	Vitriol of tin.
Sulphate of tunſtein, Sulphas tunſteni.	
Sulphate of zinc, Sulphas zinci.	White vitriol, or copperas. Vitriol of zinc. Vitriol of Goſlar.
Sulphite, Sulphis, tis, ſ. m.	Salt formed by the combination of the ſulphureous acid with different baſes.
Sulphite of alumine. Sulphis aluminoſus.	
Sulphite of ammoniac, Sulphis ammoniacalis.	
Sulphite of antimony, Sulphis ſtibii.	

New Names.	*Ancient Names.*
Sulphite of arſenic, Sulphis arſenicalis.	
Sulphite of barytes, Sulphis baryticus.	
Sulphite of biſmuth, Sulphis biſmuthi.	
Sulphite of cobalt, Sulphis cobalti.	
Sulphite of copper, Sulphis cupri.	
Sulphite of gold, Sulphis auri.	
Sulphite of iron, Sulphis ferri.	
Sulphite of lead, Sulphis plumbi.	
Sulphite of lime, Sulphis calcareus.	
Sulphite of magneſia, Sulphis magneſiæ.	
Sulphite of manganeſe, Sulphis magneſii.	
Sulphite of mercury, Sulphis hydrargyri.	
Sulphite of molybdena, Sulphis molybdeni.	
Sulphite of nickel, Sulphis niccoli.	
Sulphite of platina, Sulphis platini.	
Sulphite of potaſh, Sulphis potaſſæ.	Sulphureous ſalt of Stahl.
Sulphite of ſilver, Sulphis argenti.	
Sulphite of ſoda, Sulphis ſodæ.	
Sulphite of tin, Sulphis ſtanni.	
Sulphite of tunſtein, Sulphis tunſteni.	
Sulphite of zinc, Sulphis zinci.	
Sulphur, Sulphur.	Sulphur.

New Names.	*Ancient Names.*
Sulphur ſublimed, Sulphur ſublimatum.	Flowers of ſulphur.
Sulphure alkaline, Sulphuretum alkalinum.	Alkaline liver of ſilver. Alkaline hepar.
Sulphure of alumine, Sulphuretum aluminæ.	
Sulphure of ammoniac, Sulphuretum ammoniacale.	Boyle's fuming liquor. Volatile alkaline liver of ſulphur.
Sulphure of antimony, Sulphuretum ſtibii.	Antimony.
Sulphure of antimony, native, Sulphuretum ſtibii nativum.	Ore of antimony.
Sulphure of barytes, Sulphuretum barytæ.	Barytic liver of ſulphur.
Sulphure of biſmuth, Sulphuretum biſmuthi.	
Sulphure calcareous, Sulphuretum calcareum.	Calcareous liver of ſulphur.
Sulphure of cobalt, Sulphuretum cobalti.	
Sulphure of copper, Sulphuretum cupri.	Pyrites of copper.
Sulphure earthy, Sulphuretum terreum.	Earthy liver of ſulphur. Earthy hepar.
Sulphure of gold, Sulphuretum auri.	
Sulphure of iron, Sulphuretum ferri.	Martial pyrites.
Sulphure of fixed oil, Sulphuretum olei fixi.	Balſam of ſulphur.
Sulphure of volatile oil, Sulphuretum olei volatilis.	Balſam of ſulphur.
Sulphure of lead, Sulphuretum plumbi.	
Sulphure of magneſia, Sulphuretum magneſiæ.	Magneſian liver of ſulphur.
Sulphure of manganeſe, Sulphuretum magneſii.	
Sulphure of mercury, Sulphuretum hydrargyri.	

Sulphure

New Names.	*Ancient Names.*
Sulphures metallic, Sulphureta metallica.	Combinations of ſulphur with the metals.
Sulphure of molybdena, Sulphuretum molybdeni.	
Sulphure of nickel, Sulphuretum niccoli.	
Sulphure of platina, Sulphuretum platini.	
Sulphure of potaſh, Sulphuretum potaſſæ.	Liver of ſulphur with baſe of the vegetable alkali.
Sulphure of potaſh antimoniated. Sulphuretum potaſſæ ſtibiatum.	Antimoniated liver of ſulphur.
Sulphure of tin, Sulphuretum ſtanni.	
Sulphure of tunſtein, Sulphuretum tunſteni.	
Sulphure of zinc, Sulphuretum zinci.	Blende, or mock galena.

T.

Tartar, Tartarus.	Crude tartar.
Tartrite, Tartris, tis, ſ. m.	Salt formed by the combination of the tartareous acid with different baſes.
Tartrite acidulous of potaſh, Tartris acidulus potaſſæ.	Tartar. Cream of tartar. Cryſtals of tartar.
Tartrite of alumine, Tartris aluminoſus.	
Tartrite of ammoniac, Tartris ammoniacalis.	Ammoniacal tartar. Tartareous ſal ammoniac.
Tartrite of antimony, Tartris ſtibii.	
Tartrite of arſenic, Tartris arſenicalis.	
Tartrite of barytes, Tartris baryticus.	
Tartrite of biſmuth, Tartris biſmuthi.	

New Names.	*Ancient Names.*
Tartrite of cobalt, Tartris cobalti.	
Tartrite of copper, Tartris cupri.	
Tartrite of gold, Tartris auri.	
Tartrite of iron, Tartris ferri.	
Tartrite of lime, Tartris calcareus.	Calcareous tartar.
Tartrite of lead, Tartris plumbi.	Saturnine tartar.
Tartrite of magneſia, Tartris magneſiæ.	
Tartrite of manganeſe, Tartris magneſii.	
Tartrite of mercury, Tartris hydrargyri.	
Tartrite of molybdena, Tartris molybdeni.	
Tartrite of nickel, Tartris niccoli.	
Tartrite of platina, Tartris platini.	
Tartrite of potaſh, Tartris potaſſæ.	Tartariſed tartar. Soluble tartar. Tartar of potaſh. Vegetable ſalt.
Tartrite of potaſh antimoniated, Tartris potaſſæ ſtibiatus.	Emetic tartar. Stibiated tartar. Antimoniated tartar.
Tartrite of potaſh, ferruginous, Tartris potaſſæ ferrugineus.	Chalybiated tartar. Soluble martial tartar.
Tartrite of potaſh, ſurcompounded with antimony, Tartris potaſſæ ſtibiatus.	Tartariſed tartar containing antimony.
Tartrite of ſilver, Tartris argenti.	
Tartrite of ſoda, Tartris ſodæ.	Tartar of ſoda. Sal polychreſt of Rochelle. Salt of Seignette.

New Names.	*Antient Names.*
Tartrite of tin, Tartris ſtanni.	
Tartrite of tunſtein, Tartris tunſteni.	
Tartrite of zinc, Tartris zinci.	
Tin, Stannum.	Tin. Jupiter.
Tunſtates, Tunſtas, tis, ſ. m.	Salts formed by the combination of the tunſtic acid with different baſes. This genus of ſalts was not named in the ancient nomenclature.
Tunſtate of alumine, Tunſtas aluminoſus.	
Tunſtate of ammoniac, Tunſtas ammoniacalis	
Tunſtate of antimony, Tunſtas ſtibii.	
Tunſtate of arſenic, Tunſtas arſenicalis.	
Tunſtate of barytes, Tunſtas baryticus.	
Tunſtate of biſmuth, Tunſtas biſmuthi.	
Tunſtate of cobalt, Tunſtas cobalti.	
Tunſtate of copper, Tunſtas cupri.	
Tunſtate of gold, Tunſtas auri.	
Tunſtate of iron, Tunſtas ferri.	
Tunſtate of lead, Tunſtas plumbi.	
Tunſtate of lime, Tunſtas calcareus.	
Tunſtate of magneſia, Tunſtas magneſiæ.	
Tunſtate of manganeſe, Tunſtas magneſii.	
Tunſtate of mercury, Tunſtas hydrargyri.	

New Names.	*Ancient Names.*
Tunſtate of molybdena, Tunſtas molybdeni.	
Tunſtate of nickel, Tunſtas niccoli.	
Tunſtate of platina, Tunſtas platini.	
Tunſtate of potaſh, Tunſtas potaſſæ.	
Tunſtate of ſilver, Tunſtas argenti.	
Tunſtate of ſoda, Tunſtas ſodæ.	
Tunſtate of tin, Tunſtas ſtanni.	
Tunſtate of tunſtein, Tunſtas tunſteni.	
Tunſtate of zinc. Tunſtas zinci.	

W.

Water.	Water.
Water, lime.	Lime water.
Water diſtilled.	Diſtilled water.
Waters impregnated with the carbonic acid.	Acidulated waters. Gazeous waters.
Waters ſulphurated.	Hepatic waters.

Z.

Zinc.	Zinc.